478 2 18

Review of Educational Research

VOL. XXI, NO. 1 FEBRUARY 195

SCHOOL PLANT AND EQUIPMENT

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

A Department of the
NATIONAL EDUCATION ASSOCIATION OF THE UNITED STATES
1201 Sixteenth St., N.W., Washington 6, D. C.

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

THIS ASSOCIATION is composed of persons engaged in technical research in education, including directors of research in school systems, instructors in educational institutions, and research workers connected with private educational agencies.

Officers, February 1951—February 1952

President: PAUL R. MORT, Professor of Education, Teachers College, Columbia University, New York 27, New York.

Vicepresident: ARVIL S. BARR, Professor of Education, University of Wisconsin, Madison, Wisconsin.

Secretary-Treasurer: FRANK W. HUBBARD, Director, Research Division, National Education Association, Washington 6, D. C.

Executive Committee

Consists of five members: The president, vicepresident, secretary-treasurer, chairman of the Editorial Board, and the following immediate past president: ARTHUR E. TRAXLER, Executive Director, Educational Records Bureau, New York 32, New York.

Editorial Board

Chairman and Editor:* FRANCIS G. CORNELL, Professor of Education, University of Illinois, Champaign, Illinois.

Research
13.8.70
J 189

ROBERT J. HAVIGHURST, Professor of Education, University of Chicago, Chicago, Illinois.

GORDON N. MACKENZIE, Professor of Education, Teachers College, Columbia University, New York 27, New York.

The president; and the secretary-treasurer.

* **Assistant Editor:** DARRELL J. INABNIT, III, University of Illinois, Urbana, Illinois.

* **Editorial Assistant:** BARBARA K. HAXBY, University of Illinois, Urbana, Illinois.

Applications for membership should be sent to the secretary-treasurer. Upon approval by the Executive Committee persons applying will be invited to become members.

Subscriptions to the REVIEW should be sent to the secretary-treasurer (note address above).

Orders for one or more publications, accompanied by funds in payment, should be sent to the American Educational Research Association, 1201 Sixteenth St., N. W., Washington 6, D. C. For a list of titles see the back inside cover page.

Active members of the Association pay dues of $7 annually. Associate members pay $6 annually. Of this amount $5 is for subscription to the REVIEW. The REVIEW is published in February, April, June, October, and December. Beginning with the February 1949 issue single copies are priced at $1.50.

Entered as second-class matter April 10, 1931, at the post office at Washington, D. C., under the Act of August 24, 1912.

478 z18

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association.
Contents are listed in the Education Index.

Copyright 1951
By National Education Association of the United States, Washington, D. C.

Vol. XXI, No. 1 **February 1951**

School Plant and Equipment

Reviews the literature for the period, January 1948 thru July 1950. Volume XVIII, Number 1, February 1948, covers the previous three-year period.

TABLE OF CONTENTS

Chapter *Page*

Foreword 4

I. School-Plant Programs 5
William E. Arnold, *University of Pennsylvania, Philadelphia*
William B. Castetter, *University of Pennsylvania, Philadelphia*

II. Planning Procedures 10
Russell T. Gregg, *University of Wisconsin, Madison*
Stephen J. Knezevich, *University of Wisconsin, Madison*

III. Space and Facility Requirements 17
James D. MacConnell, *Stanford University, Stanford, California*

IV. Trend in Materials and Design 28
Archie L. Gray, *University of North Dakota, Grand Forks*
Jerald Blake, *University of North Dakota, Grand Forks*

V. Mechanical Facilities 36
John H. Herrick, *The Ohio State University, Columbus*
Paul W. Seagers, *Indiana University, Bloomington*

VI. Financing School-Plant Developments 44
Dan H. Cooper, *State University of Iowa, Iowa City*

Chapter *Page*

VII. School-Plant Operation and Management 57

John E. Phay, *University of Mississippi, University*
James W. Hunt, *University of Mississippi, University*

VIII. Needed Research in the School-Plant Field 63

Archie L. Gray, *University of North Dakota, Grand Forks*

Index 69

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association.
Contents are listed in the Education Index.

Copyright 1951
By National Education Association of the United States, Washington, D. C.

Vol. XXI, No. 2 **April 1951**

Guidance and Counseling

Reviews the literature for the period November 1947 thru September 1950. Vol. XVIII, No. 2, April 1948, covers the literature for the previous three-year period.

TABLE OF CONTENTS

Chapter *Page*

Foreword 74

I. Characteristics and Needs of Individuals 75
CHARLES E. MEYERS, *University of Southern California, Los Angeles, California*
FRANK J. ESTVAN, *University of Southern California, Los Angeles, California*
RAYMOND C. PERRY, *University of Southern California, Los Angeles, California*

II. Conditions Affecting the Guidance Program 86
PHILIP A. BOYER, *Philadelphia Public Schools, Philadelphia, Pennsylvania*
MINERVA F. DESING, *Philadelphia Public Schools, Philadelphia, Pennsylvania*
MARY ALICE LAIRD, *Philadelphia Public Schools, Philadelphia, Pennsylvania*

Chapter *Page*

III. Programs of Guidance 106
Elmer E. Wagner, *University of Southern California, Los Angeles, California*
Dugald S. Arbuckle, *Boston University, Boston, Massachusetts*
Earl F. Carnes, *University of Southern California, Los Angeles, California*

IV. Appraisal of the Individual 115
Paul L. Dressel, *Michigan State College, East Lansing, Michigan*
William A. Mann, *Michigan State College, East Lansing, Michigan*

V. Counseling 132
John W. M. Rothney, *University of Wisconsin, Madison, Wisconsin*
Paul J. Danielson, *University of Wisconsin, Madison, Wisconsin*

VI. Guidance Thru Groups 140
Jane Warters, *State Teachers College, Lock Haven, Pennsylvania*

VII. Educational and Vocational Information 149
Walter J. Greenleaf, *U. S. Office of Education, Washington, D. C.*

VIII. Preparation of Teachers and Specialists for Guidance Service .. 159
Clifford P. Froehlich, *U. S. Office of Education, Washington, D. C.*

Index 167

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association. Contents are listed in the Education Index.

Copyright 1951
By National Education Association of the United States, Washington, D. C.

Vol. XXI, No. 3 **June 1951**

The Curriculum: Learning and Teaching

Reviews the literature for the three-year period since the issuance of Vol. XVIII, No. 3, June 1948.

TABLE OF CONTENTS

Chapter *Page*

Foreword 172

I. Philosophy, Goals, and Social Factors 173
J. MINOR GWYNN, *University of North Carolina, Chapel Hill, North Carolina*

II. Growth, Development, Learning, and Maturation as Factors in Curriculum and Teaching 186
WILLIAM C. TROW, *University of Michigan, Ann Arbor, Michigan*

III. Design and Pattern of the Curriculum 196
ARTHUR W. GILBERT, *Public Schools, Kansas City, Missouri*

IV. Teaching Materials 209
WILLIAM G. BRINK, *Northwestern University, Evanston, Illinois*
JOHN X. JAMRICH, *Northwestern University, Evanston, Illinois*

V. Learning Materials 220
HENRY J. OTTO, *University of Texas, Austin, Texas*
DONALD MCDONALD, *University of Texas, Austin, Texas*

Chapter *Page*

VI. Curriculum Development 227

GORDON N. MACKENZIE, *Columbia University, New York, New York*
CLIFFORD BEBELL, *Columbia University, New York, New York*

Supplementary Directory 238

Index 243

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association.
Contents are listed in the Education Index.

Copyright 1951
By National Education Association of the United States, Washington, D. C.

478 Z 18

Vol. XXI, No. 4 **October 1951**

The Natural Sciences and Mathematics

Reviews the literature for the three-year period since the issuance of Vol. XVIII, No. 4, October 1948. Earlier research related to this topic was reviewed in Vol. XV, No. 4, October 1945.

TABLE OF CONTENTS

Chapter *Page*

Foreword 247

I. The Science Curriculum 249
ELSA MEDER, *Houghton Mifflin Company, Boston, Massachusetts*

II. Instructional Procedures in Science 264
R. WILL BURNETT, *University of Illinois, Urbana, Illinois*
THEODORE POROWSKI, *University of Illinois, Urbana, Illinois*

III. Materials in the Teaching of Science 279
JOHN S. RICHARDSON, *Ohio State University, Columbus, Ohio*
G. P. CAHOON, *Ohio State University, Columbus, Ohio*
JAMES A. RUTLEDGE, *Ohio State University, Columbus, Ohio*

IV. The Teaching of Mathematics in Grades I thru VIII 290
ROBERT L. BURCH, *Boston University, Boston, Massachusetts*
HAROLD E. MOSER, *State Teachers College, Towson, Maryland*

V. The Teaching of Mathematics in High School and College 305
LUCIEN B. KINNEY, *Stanford University, Stanford, California*
EDWIN EAGLE, *San Diego State College, San Diego, California*
CHARLES PURDY, *San Jose State College, San Jose, California*

VI. Teacher Education in Arithmetic 317
J. FRED WEAVER, *State Teachers College, Towson, Maryland*

Index 321

This issue of the REVIEW was prepared by the
Committee on the Natural Sciences and Mathematics

HARRY E. BENZ, *Chairman*, Ohio University, Athens, Ohio
ROBERT L. BURCH, Boston University, Boston, Massachusetts
LUCIEN B. KINNEY, Stanford University, Stanford, California
ELSA M. MEDER, Houghton Mifflin Company, Boston, Massachusetts

with the assistance of

R. WILL BURNETT, University of Illinois, Urbana, Illinois
G. P. CAHOON, Ohio State University, Columbus, Ohio
EDWIN EAGLE, San Diego State College, San Diego, California
HAROLD E. MOSER, State Teachers College, Towson, Maryland
THEODORE POROWSKI, University of Illinois, Urbana, Illinois
CHARLES PURDY, San Jose State College, San Jose, California
JOHN S. RICHARDSON, Ohio State University, Columbus, Ohio
JAMES A. RUTLEDGE, Ohio State University, Columbus, Ohio
J. FRED WEAVER, State Teachers College, Towson, Maryland

This issue of the REVIEW was prepared by the
Committee on School Plant and Equipment

NELSON E. VILES, *Chairman*, U. S. Office of Education, Washington, D. C.
DAN H. COOPER, *Co-chairman*, State University of Iowa, Iowa City
WILLIAM E. ARNOLD, University of Pennsylvania, Philadelphia
J. HAROLD GOLDTHORPE, U. S. Office of Education, Washington, D. C.
JOHN H. HERRICK, The Ohio State University, Columbus
ALFRED V. OVERN, University of North Dakota, Grand Forks
JOHN E. PHAY, University of Mississippi, University

with the assistance of

JERALD BLAKE, University of North Dakota, Grand Forks
WILLIAM B. CASTETTER, University of Pennsylvania, Philadelphia
ARCHIE L. GRAY, University of North Dakota, Grand Forks
RUSSELL T. GREGG, University of Wisconsin, Madison
CHARLIE B. HOUSER, University of Pennsylvania, Philadelphia
JAMES W. HUNT, University of Mississippi, University
STEPHEN J. KNEZEVICH, University of Wisconsin, Madison
JAMES D. MACCONNELL, Stanford University, Stanford, California
N. LEROY NELSON, State University of Iowa, Iowa City
PAUL W. SEAGERS, Indiana University, Bloomington

FOREWORD

In the Foreword of the Review on the School Plant and Equipment published three years ago, the editor reported that research on school-plant problems was "dangerously near the vanishing point." Apparently the decision at that time to continue publication of reviews of research on the subject of school plant was favorable only because of the need for research, rather than because of the existence of such research. In the preparation of the present issue, the committee found that there is still only a limited amount of published research, but it is gratifying to observe that the accumulated research of the past three years is somewhat larger than was reported in the preceding cycle. Gradually, professional educators are getting "tooled up" for the large amount of school building in the nation which has been done and which continues to be needed. Far too little research on school plant is being produced; but research activity on the topic probably does not now lag much behind research activity on many other important educational subjects.

Unfortunately, the improved condition of research on school plant during the past triennium is only relative. There is little cause for contentment. In terms of the amount of present and of anticipated school-building construction, the supply of factual data and of proven conclusions is tragically limited. Architects, school administrators, and schoolboard members engaged in the tasks of providing schoolhousing for expanding and shifting enrolments lack many items of essential information. It is greatly to be hoped that enlarged research facilities for school-plant problems will become available.

In the absence of a more extensive body of research, many of the references summarized in this issue are reports of logical analyses of problems, of personal experiences, or of current practices. Nevertheless, in many cases, because of the experience and competence of the authors, these reports are of great value.

The chapters in the present volume of the Review do not follow the organization of material in previous issues on school plant and equipment. Since no definite pattern of organization has been established in previous issues, the committee for this issue has selected an organization consisting of relatively few chapters devoted to broad, persistent topics.

Nelson E. Viles, *Chairman*
Dan H. Cooper, *Co-chairman*
Committee on School Plant and Equipment

CHAPTER I

School-Plant Programs

WILLIAM E. ARNOLD and WILLIAM B. CASTETTER *

THE seemingly endless stream of children flowing into our schools, coupled with other factors such as rising costs, obsolescent buildings, new communities, expansion of programs and services, and inadequate methods of financing new construction, have brought into bold relief some rather formidable school-plant problems. Moreover, the military situation in the Far East, as well as attendant global economic commitments, may affect indefinitely and unfavorably the realization of an adequate school plant for our children.

Perhaps as a result of the critical shortage in school-plant facilities, public concern about the problem has increased appreciably during the period under consideration in this review. Lay committees, educators and educational groups, legislative bodies and governmental agencies, as well as radio, television, and press facilities, have constantly emphasized the importance of the school-plant problem and ways by which it may be overcome.

Data on School-Plant Status

The literature of this period treating the public school plant indicates an increasing concern over present inadequacies. Significant facts and figures on various aspects of school-plant needs were presented by Hamon (20, 21), Hecht (22), Field (15), McGraw (25), Booker (5), Hagman (18), Morphet (28), Exton (12), McLeary (26), Foster and Conrad (16), Cocking (8), Viles (43), the U. S. Office of Education (42), the NEA Research Division (30), American School Board Journal (4), School Life (38), School Management (40), School Executive (37), and the American Association of School Administrators (2). Net conclusions of these reports indicate that: (a) there will be a continued increase in school enrolments, and probably 10 million more children will be found in elementary and secondary schools in 1960 than in 1947-48; (b) a minimum expenditure of $10 billion will be needed to provide buildings for estimated increases in enrolments; (c) 15 to 20 percent of the schools of the nation are obsolescent, replacement of which will require funds in addition to those noted above; (d) the backlog of plant needs cannot be eliminated until present methods of financing capital improvement programs are improved.

---

* With the assistance of Charlie B. Houser.

Federal Level

The school-plant crisis has not been without remedial proposals. At the federal level, Hamon (19) reported that 43 schoolhousing bills were introduced in the first session of the Eighty-First Congress. Analysis of these proposals (13) revealed serious limitations in suggested methods of administration, such as the circumvention of state departments of education and the U. S. Office of Education in favor of other agencies.

During the period under consideration, federal legislation enacted relative to school-building construction may be summarized briefly as follows (41):

(a) *Public Law 874:* provided assistance for current operating expenses to those school systems upon which the United States government has placed financial burdens, such as "sudden and substantial increase in school attendance as the result of Federal activities."

(b) *Public Law 815:* provided $3 million to assist the several states in inventorying existing school facilities. This act is administered by the Commissioner of Education, and designates the state educational agency to carry out purposes of the act.

(c) *Public Law 352:* authorized federal loans for advanced planning of public works. Under this program, public schools can borrow money for the preparation of drawings and specifications for school plants. Loans or advances under this act are to be repaid without interest. A sum not to exceed $100 million was authorized by Congress, no loan under which may be made unless approved by state authorities. The administrator of General Services is authorized to administer the purposes of the act.

State Level

At the state level, increased recognition of the need for more adequate state financial assistance for capital outlay was apparent. Connecticut (39) enacted a 20-year school-building aid law, which is designed to assist local school districts in financing school construction.

New approaches being made in providing state aid for capital outlay have been identified by the American Association of School Administrators (2). These include apportionment of state funds on an equalization basis, equalized matching formulas, state loan funds, accumulation of capital outlay funds from current levies in advance of construction, formation of local nonprofit corporations, and state public school-building authorities. Morphet and Lindman (27) reported that 20 states include special provision for school capital needs in their state support programs. Most states, it was noted, provide capital outlay aid in a separate fund, altho Alabama and Florida capital outlay and debt service aid is apportioned annually as an integral part of the foundation program.

Other significant state plans for capital outlay aid are now in operation in California, Washington, and New York (7). The California plan provides for building aid to needy districts on a combination loan-grant basis. The Washington plan is based on a combined "equalization-matching" formula in which the state provides from 25 to 75 percent of the cost of approved projects, depending upon the financial ability of the district aided. In New York, central school districts having an approved building program provide an amount equal to 6 percent of the assessed valuation of the district, and the state supplies the remainder up to $450 per pupil enrolled.

In reviewing the provisions for the school plant in the 48 state school systems, the Council of State Governments' report (9) noted that there are 29 states in which all, or practically all, financial support for school-plant construction must come from local sources, chiefly from the property tax.

Local Level

Locally, many school districts were forced to "devise and adjust" in order to meet the pressing need for more classrooms. Chicago (3), Seattle (23), Tacoma (35), and Milwaukee (6) systems employed portable school units to house increased enrolments. Other stop-gap proposals included a plan by Feather (14) to cut class sizes in half by operating an all-year school with two terms of six months each. Garver (17) reported a Hobart, Indiana, experiment in low cost school construction which involved utilization of a type of steel designed for factories and warehouses. Cost of construction per cubic foot was 53 cents. Examples of local school programs, based on intensive surveys, were found in Tuscaloosa, Alabama (1), San Francisco, California (10), Moline, Illinois (24), Springfield, Ohio (32), and Harrisburg, Pennsylvania (33). The latter plan, developed by the Educational Service Bureau, University of Pennsylvania, included a plant program ranging from 10 to 20 years.

Accomplishments in school-plant programs thruout the nation have been noteworthy tho still inadequate. Most notable is the increase in functional school buildings, built around activities of the child, teacher, and community. Other trends reported by Hamon (20) include larger sites, increased storage space, provisions for plant adaptability, better seeing facilities, and one-story, open type plants.

From the evidence now available, it is apparent that hundreds of local school districts are unable to build new plants under present methods of financing capital outlay programs. Cocking (8) asserted that it is necessary for all three levels of government—federal, state, and local—to participate in assuming financial responsibility for securing adequate school buildings. Morphet (28) outlined suggestions for responsibilities to be borne by each level of government. At the federal level, this would include: (a) development of plans for assisting states and local units to determine needs, limitations, and abilities; (b) a program for helping states meet plant needs; and (c) a plan for dealing with states rather than local units. State responsibility would involve reorganization of school districts, revision of many state limitations and restrictions on school-plant construction, inclusion of plant needs in foundation programs, and provision for more adequate consultant services. Local district responsibility would involve better planning studies of need, utilizing school-plant specialists, and an emphasis on the pay-as-you-go plan of financing capital improvements.

The foregoing suggestions parallel the conclusions and recommendations of the Cooperative Work-Conference (7) at the University of California on financing school-plant programs. These recommendations included the following points: (a) increased state assistance in financing school-plant programs; (b) comprehensive state studies of school-building needs; (c) utilization of appropriate state agencies, coordinated by the state educational agency; (d) development of appropriate state controls and standards; and (e) a continuing plant program to meet capital outlay needs over a period of years.

Bibliography

1. ALABAMA. UNIVERSITY. *School Building Program for the City of Tuscaloosa.* Bulletin Number 14, Volume 41, Studies in Education Number 11. Tuscaloosa: University of Alabama Press, 1948. 48 p.
2. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *American School Buildings.* Twenty-Seventh Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. 525 p.
3. AMERICAN SCHOOL BOARD JOURNAL. "Chicago's New Portable School Units." *American School Board Journal* 119: 53; September 1949.
4. AMERICAN SCHOOL BOARD JOURNAL. "School Building Construction in 1948." *American School Board Journal* 116: 54; January 1948.
5. BOOKER, IVAN A. "Build That School House Now." *Journal of the National Education Association* 38: 30-31; January 1949.
6. BRUHNKE, L. T. "Portable Rooms for New Schools." *School Executive* 68: 30-31; June 1949.
7. CALIFORNIA. UNIVERSITY. *Report of Cooperative Work-Conference on Financing School Plant Programs—Emergency and Long-Range Provisions.* Berkeley: University of California, School of Education, 1950. 51 p.
8. COCKING, WALTER D. "Getting the Money for School Plants." *School Executive* 69: 5; February 1950.
9. COUNCIL OF STATE GOVERNMENTS. *The Forty-Eight State School Systems.* Chicago: the Council, 1949. 245 p.
10. ENGELHARDT, NICKOLAUS L. "School Building Survey of San Francisco, California." *American School Board Journal* 117: 41-45; October 1948.
11. EWING, OSCAR R. "Education—An Investment in People." *School Life* 30: 3-5; April 1948.
12. EXTON, ELAINE. "America's School Building Crisis." *American School Board Journal* 120: 23-24, 100; January 1950.
13. EXTON, ELAINE. "The Schoolhousing Situation—Observations Concerning State and Federal Aid." *American School Board Journal* 118: 61-62, 64; January 1949.
14. FEATHER, WILLIAM, JR. "How To Relieve Crowded Schools if New Building Is Impossible." *School Management* 18: 3; October 1948.
15. FIELD, GEORGE H. "Can We Meet the Need for Schools." *Secondary Education* 13: 20-22; February 1948.
16. FOSTER, EMERY M., and CONRAD, HERBERT S. "Magnitude of the Nation's Educational Task Today and in the Years Ahead." *School Life* 32: 88-89; March 1950.
17. GARVER, HARLIE. "Experiment In Low Cost School Construction." *School Executive* 68: 25-27; July 1949.
18. HAGMAN, HARLAN L. "Creeping Paralysis in School Buildings." *American School Board Journal* 116: 33-34; March 1948.

19. Hamon, Ray L. "Concepts Reflected in Schoolhousing Bills." *School Life* 32: 42; December 1949.
20. Hamon, Ray L. "School and College Building Crisis." *School Life* 31: 12, 16; October 1948.
21. Hamon, Ray L. "The Race Between School Children and Schoolhouses." *School Life* 32: 8-9; October 1949.
22. Hecht, George J. "Our Desperate Need for More Schools and What Can Be Done About It." *Parents' Magazine* 23: 40-41, 148-52; September 1948.
23. Huggard, Francis E. "Seattle's Transportable Schools." *American School Board Journal* 119: 33-36; August 1949.
24. Jardine, Alex. "Initial Steps in the Moline Building Program." *American School Board Journal* 120: 35; March 1950.
25. McGraw, James H., Jr. "School Buildings Are Needed." *Bulletin of the National Association of Secondary-School Principals* 32: 100-101; October 1948.
26. McLeary, Ralph D. "The School Building Crisis." *School Management* 18: 7-8; November 1948.
27. Morphet, Edgar L., and Lindman, Erick L. *Public School Finance Programs of the Forty-Eight States.* Washington: U. S. Government Printing Office, 1950. 110 p.
28. Morphet, Edgar L. "Financing School Building Programs." *American School Board Journal* 119: 20-22; September 1949.
29. Morphet, Edgar L. "School Capital Outlay Programs; Detailed Surveys Showed Florida Counties What Their School Building Needs Are and How They Can Be Financed." *School Executive* 68: 47-48; February 1949.
30. National Education Association, Research Division. "School Housing Needs in City School Systems, 1947-48." *Research Bulletin* 26: 143-66; December 1948.
31. National Education Association, Research Division, and American Association of School Administrators. *Status of School Housing, 1947-48, in 220 School Systems in Cities over 30,000 in Population.* Educational Research Service Circular No. 3, April 1948. Washington, D. C.: the Association, 1948. 47 p.
32. Ohio State University. *Study of Public School Building Needs in Springfield.* Columbus: Bureau of Educational Research, 1949. 96 p.
33. Pennsylvania University. *School Building Survey of Harrisburg, Pennsylvania.* Philadelphia: Educational Service Bureau, 1949. 76 p.
34. Pittenger, Benjamin F. "Some Observations About High School Building Needs." *American School Board Journal* 118: 35-36; January 1949.
35. Priaulx, Arthur W. "Movable Schoolroom May Solve West's Big School Headache." *American School Board Journal* 120: 61, 94; January 1950.
36. School and Society. "Rising Birth Rate and the School-Building Program in New York City." *School and Society* 69; 399-400; June 1949.
37. School Executive. "School Plant Construction in 1947 and Prospects for 1948." *School Executive* 67: 66; February 1948.
38. School Life. "Babies Today—Pupils Tomorrow." *School Life* 31: 7; December 1948.
39. School Life. "20-Year School Building Aid Law." *School Life* 32: 79; February 1950.
40. School Management. "13.5 Billions Are Needed for New Buildings." *School Management* 19: 9; May 1950.
41. U. S. Office of Education, Federal Security Agency. *Commissioner's Bulletin Number 67, Field Bulletin 4.* Washington, D. C.: Superintendent of Documents, U. S. Government Printing Office, October 12, 1950. 5 p. (Mimeo.)
42. U. S. Office of Education, Federal Security Agency. "School Building Needs." *Annual Report of the Federal Security Agency* 1949. Washington, D. C.: Superintendent of Documents, U. S. Government Printing Office, 1950. 102 p.
43. Viles, Nelson E.; Pulliam, Nolan D.; and Gibbs, A. H. "Educational Plant Needs." *School Life* 30: 28-29; January 1948.

CHAPTER II

Planning Procedures

RUSSELL T. GREGG and STEPHEN J. KNEZEVICH

IN THE last number of the REVIEW on this topic it was pointed out that most of the literature concerning school-plant planning was devoted to *what* should be found in a school plant and *how* it should be financed rather than to the process of planning school buildings. The same is true today. Many writers have given passing reference to the desirability of participation of individuals and groups in planning, but comparatively few have discussed the organizations and processes which would utilize such participation.

School buildings are relatively permanent objects, and accordingly they must be planned and built to accommodate adequate educational programs of the future as well as present programs. As Fowlkes (17) pointed out, a school building is the largest item of instructional equipment available to faculty and students. All possible resources should be utilized in planning such equipment. Schoolboard members, administrators, architects, teachers, pupils, community leaders, and technical consultants of various kinds can contribute to the planning. The real problem is the obtaining and correlating of all the ideas which may result in better school-plant facilities.

The Problem of School-Plant Planning

The literature revealed a great deal more emphasis on the nature of the problems to be considered in planning school buildings than on the planning process itself. Five major problems of planning were discussed by Wilson (45). These were (a) determining the nature of the educational program, (b) outlining the ideal school plant, (c) evaluating the existing school plant, (d) setting up the practical school-plant expansion program, and (e) deciding on a building schedule. In addition, Holy (24) emphasized determining the type of school organization and predicting future enrolment. Essex (16) discussed nine principles of school building design: safety, comfort and health, beauty, expansibility, flexibility, association of instructional spaces, accessibility of facilities, adequacy for community use, and economy. Problems of planning the secondary school as related to site, classrooms, library, auditoriums, gymnasiums, lunchrooms, and administrative areas were treated by Hamon (20).

The National Council on Schoolhouse Construction (27) presented an over-all treatment of the elements involved in the planning of school plants. The American Council on Education (3) published a pamphlet which gave a brief treatment of a wide range of planning problems.

Twelve principles of value to persons planning school buildings were selected from the literature and reported by Vincent (39). McFadzean (26) considered four essential factors in site planning: (a) location and accessibility, (b) size, (c) physical characteristics, and (d) utility installations. The New England School Development Council (28) indicated nine elements to be considered in the selection and development of school sites. Engelhardt (12) explained factors of importance in the formulation of site needs for large urban areas.

Planning Organization and Personnel

Six steps in school-building planning were described by Courter (9) who recommended use of the resources of the professional staff and of selected lay groups. He believed that the superintendent should (a) organize a series of committees, (b) provide them with consultants, (c) keep in touch with their deliberations, and (d) expect from them reports of their conclusions. Four patterns of organization for school-building programs were proposed by Whitehead (44) and related to sizes of school systems. Functions and duties of key personnel in the planning process also received attention. Cyr and Linn (10) pointed out some educational and community activities which could be utilized in planning a school building for a rural community. Whitehead and Featherstone (43) discussed the purposes of school-plant planning organizations, including committees and their functions. Herrick (21) believed that cooperative planning procedures should be fitted to local conditions and that their effectiveness depended on available leadership.

A very extensive study of committee organization in school-building planning was made by Seagers (35). This investigation was designed to determine and utilize some technics in securing the participation of school personnel, pupils, and parents in planning. Work of the committees was described and difficulties encountered were pointed out. A guide for community participation in planning was published by the New York State Education Department (29). A lay advisory committee was recommended and worksheet forms were included to enable the committee to gather community data and to report its conclusions.

Engelhardt (14) illustrated the kinds of information that the school administrator should furnish to the architect. The information included statements of educational policy and program, and space requirements for various types of schools. Schoolman White (41) and architect Perkins (30) also voiced the opinion that if intelligent architectural planning is to be expected the architect must be provided with clear statements of educational concepts and specific information about space requirements and relationships. The values of surveys by outside experts to promote long-range planning of school-plant facilities were explained by Reavis (32). The school survey was also recommended as an important phase of planning by Stoneman, Broady, and Brainard (37) but they encouraged local participation in the survey.

Whitehead (42) explained the functions and relationships of the educational consultant. Grace (18) discussed the contributions of the state department of education and placed emphasis on consultation and advice rather than on regulation and prescription. Methods and values of teacher participation in school-plant planning were reported by Alexander (1). Sholy (36) reported an unusual method of lay participation.

Only one study was found which was concerned with the evaluation of planning procedures employed in different school systems. This was an investigation by Johnson (25) who determined the extent to which certain planning activities were employed in the development of five junior-college buildings. He concluded that the planning procedures utilized in the five situations were not satisfactory.

Coordinating the Planning Procedures

Many agencies and individuals have an interest in, and can contribute significantly to, the planning of school plants. Coordination of the efforts of these individuals and agencies is a necessity if the best results are to be attained. Cooper (8) stated that effective school-plant planning necessitates an adequate program of city planning, a long-range plan for the development of the school plant, and satisfactory coordination between the two. The importance of cooperation among public officials, boards of education, school employees, city planning personnel, and citizens was emphasized. Holy (22) pointed out that satisfactory school-plant planning is possible only when there is well conceived city planning closely coordinated with school-plant planning. He studied 100 city plans, obtained opinions from a number of city planners, and prepared a list of types of information which boards of education should furnish to planning commissions and also a list that city planners should supply to boards of education. Holy (23) also discussed such factors as major streets, railroads, civic beauty, recreational areas, and zoning in relation to their implications for the coordination of city and school-plant planning. Three ways in which planning commissions can be of assistance to boards of education were explained by Bursch (5). Briscoe (4) reported how the personnel of the Oakland, California, school system participated in the development of a city master plan, of which the school's program is one part.

Davis (11) discussed the major duties and the relationships of the school committee, the educational consultant, and the architect. Westby (40) reported on ways of coordinating the efforts of representatives from the state department of education, faculty advisory committee, and citizen advisory committee. Engelhardt (13) presented a flow chart of school building projects in the New York City schools. The chart indicated the steps taken and the agencies involved from inception of the project to the acceptance of final plans. The nature of school-plant codes, standards, and guides, and their place in school-plant planning, were discussed by Viles (38).

There is evidence of increased attention being given to conferences and workshops in which architects, contractors, schoolboard members, superintendents of schools, and other educational workers cooperatively study the problems of school-plant planning. Examples of such conferences were those conducted at New York University (7), the University of Wisconsin (19), and the University of Washington (34).

General Studies

Several important general reports in the school-plant field were published. The 1949 yearbook of the American Association of School Administrators (2) treated the entire school-building problem. One chapter was devoted to organization and administrative procedures for school-plant planning. Two other chapters dealt with the problems of projecting the educational program and planning the school site. Caudill (6) presented a small but excellent book in which he proposed how eight important questions relating to long-range school-plant planning can be answered in individual communities. A comprehensive book concerned with both educational and architectural planning, with particular attention to the elementary school, was written by Perkins and Cocking (31). An unusually strong attitude toward cooperative planning prevails thruout the book. A book by Engelhardt, Engelhardt, and Leggett (15) concerned itself exclusively with secondary-school buildings. Criteria and standards for functional secondary-school buildings, rather than the processes of planning themselves, were emphasized.

Eight articles published in a single issue of the *School Executive* (33) presented a comprehensive overview of the school-plant planning problem. Topics treated included: (a) community participation in planning; (b) functions of the board of education, superintendent, architect, professional staff, state department, and education specialist; and (c) the job of coordinating the planning enterprise.

Summary

Many of the books and articles treating the subject of school-plant facilities have suggested the desirability of wide participation of both lay and professional personnel in the planning of these facilities. The opinion appears to have become quite widespread that such participation has value not only in terms of better planned facilities but also in increased willingness to finance the school-plant program. To date, however, there is practically no research evidence to substantiate the validity of this opinion.

The studies by Seagers (35) and Johnson (25) represent a beginning of what may become a concentrated research attack concerning the values and problems of organizations and processes for school-plant planning. Investigations are greatly needed which will provide (a) the bases for determining desirable organization for cooperative planning, (b) technics for effective participation by a wide variety of groups and individuals, and (c) the effects of such participation in producing functional plans and financial support for school-plant facilities. Indeed, the area of school-plant planning is a fertile field for developing and evaluating organizations and procedures which may have significant implications for the whole problem of democracy in school administration.

Bibliography

1. ALEXANDER, ROBERT E. "The Planning Process Behind the Blueprint." *The American School and University.* Twentieth Annual Edition. New York: American School Publishing Corporation, 1948. p. 202-15.
2. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *American School Buildings.* Twenty-Seventh Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. 525 p.
3. AMERICAN COUNCIL ON EDUCATION, COMMITTEE ON EDUCATIONAL BUILDINGS AND EQUIPMENT. *Things To Consider in Planning Educational Plants.* School Plant Research, Series 7, Number 4. Washington, D. C.: the Council, 1948. 17 p.
4. BRISCOE, WILLIAM S. "Cooperative Planning in the School Building Program." *The American School and University.* Twentieth Annual Edition. New York: American School Publishing Corporation, 1948. p. 231-35.
5. BURSCH, CHARLES W. "Planning Commissions Help." *Nation's Schools* 40: 37-39; September 1947.
6. CAUDILL, WILLIAM W. *Your Schools, An Approach to Long Range Planning of Schools.* College Station: Texas Engineering Experiment Station, A & M College, 1950. 43 p.
7. COCKING, WALTER D.; BAILEY, JAMES H.; and SHAW, ARCHIBALD B. "Project: Planning an Elementary School." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 92-100.
8. COOPER, DAN H. "The Coordination of Community Planning and School Plant Planning." *Administrative Planning for School Programs and Plants.* Proceedings, Sixteenth Annual Conference for Administrative Officers of Public and Private Schools. Chicago: University of Chicago Press, 1947. p. 39-52.
9. COURTER, CLAUDE V. "The School Administrator Initiates a School Building Program." *Administrative Planning for School Programs and Plants.* Proceedings, Sixteenth Annual Conference for Administrative Officers of Public and Private Schools. Chicago: University of Chicago Press, 1947. p. 53-66.
10. CYR, FRANK W., and LINN, HENRY H. *Planning Rural Community School Buildings.* New York: Teachers College, Columbia University, 1949. p. 2-12.
11. DAVIS, JESSE B. *Conducting a School Building Program.* Cambridge, Massachusetts: New England School Development Council, June 1947. 8 p. (Multilithed)
12. ENGELHARDT, NICKOLAUS L. "Anticipatory School Site Selection and Purchase." *American School Board Journal* 116: 33-34, 73-75; January 1948.
13. ENGELHARDT, NICKOLAUS L. "Flow Chart of School Building Projects." *School Executive* 67: 75-76; February 1948.
14. ENGELHARDT, NICKOLAUS L. "The School Administrator's Responsibility to the School Architect." *Education in Transition.* Proceedings, Thirty-Fourth Annual Schoolmen's Week. Philadelphia: The University of Pennsylvania, 1947. p. 344-55.
15. ENGELHARDT, NICKOLAUS L.; ENGELHARDT, NICKOLAUS L., JR.; and LEGGETT, STANTON. *Planning Secondary School Buildings.* New York: Reinhold Publishing Corporation, 1949. 252 p.
16. ESSEX, DON L. "Basic Principles of School Building Design." *American School Board Journal* 116: 19-20; January 1948.
17. FOWLKES, JOHN GUY. "What Are the Trends in Planning and Constructing of Junior and Senior High School Buildings and Plants?" *Bulletin of the National Association of Secondary-School Principals* 33: 214-17; May 1949.

18. Grace, Alonzo G. "The Influence of State Departments of Education on School Building Construction." *Administrative Planning for School Programs and Plants.* Proceedings, Sixteenth Annual Conference for Administrative Officers of Public and Private Schools. Chicago: University of Chicago Press, 1947. p. 118-27.
19. Gregg, Russell T., editor. *Planning Modern School Buildings.* Madison: School of Education, University of Wisconsin, 1948. 72 p. (Multilithed)
20. Hamon, Ray L. "School Plant Essentials for a Functional Program." *Bulletin of the National Association of Secondary-School Principals* 32: 202-13; March 1948.
21. Herrick, John H. "The Development of Educational Specifications in Planning the Secondary School Plant." *Bulletin of the National Association of Secondary-School Principals* 32: 213-19; March 1948.
22. Holy, Russell A. "The Exchange of Information Between Boards of Education and City Planning Commissions." *American School Board Journal* 119: 29-30; July 1949.
23. Holy, Russell A. "Relations Between City Planning and School Plant Planning." *American School Board Journal* 118: 19-20; January 1949.
24. Holy, Thomas C. "Essential Preliminary Planning for the School Plant Program." *Redirecting Education.* Proceedings, Thirty-Fifth Annual Schoolmen's Week. Philadelphia: The University of Pennsylvania, 1948. p. 45-66.
25. Johnson, Milo Perry. *A Study of Planning, Methods, and Techniques for Building New Junior Colleges.* Doctor's thesis. Los Angeles: The University of California, 1950. 272 p.
26. McFadzean, John. "Examples of Site Planning, with Emphasis on the Fifty Acre Community-High School Recreation Area in Reno." *Nation's Schools* 44: 34-39; July 1949.
27. National Council on Schoolhouse Construction. *Guide for Planning School Plants.* Nashville, Tennessee: the Council (Secretary: W. D. McClurkin, George Peabody College for Teachers), 1949. p. 1-16.
28. New England School Development Council. *How To Choose a School Site.* Cambridge, Massachusetts: the Council, February 1947. 14 p. (Multilithed)
29. New York State Education Department. *Room To Learn: A Guide for Community Participation in Planning for School Building Needs.* Albany: the Department, 1949. 27 p.
30. Perkins, Lawrence B. "Translating Educational Needs into Building Plans." *Administrative Planning for School Programs and Plants.* Proceedings, Sixteenth Annual Conference for Administrative Officers of Public and Private Schools. Chicago: University of Chicago Press, 1947. p. 80-87.
31. Perkins, Lawrence B., and Cocking, Walter D. *Schools.* New York: Reinhold Publishing Corporation, 1949. 264 p.
32. Reavis, William C. "The School Survey As a Basis for School Plant Planning." *Administrative Planning for School Programs and Plants.* Proceedings, Sixteenth Annual Conference for Administrative Officers of Public and Private Schools. Chicago: University of Chicago Press, 1947. p. 67-79.
33. School Executive Planning Section. "Planning the School Plant." *School Executive* 67: 37-52; December 1947.
34. School Life. "Plans for Developing a School Building Program." *School Life* 31: 3, 10; November 1948.
35. Seagers, Paul W. *Community Participation in School Building Planning.* Doctor of Education project. New York: Teachers College, Columbia University, 1950. 121 p.
36. Sholy, George I. "Their Building Policies Guided by Table Talks." *Nation's Schools* 44: 30-31; July 1949.
37. Stoneman, Merle E.; Broady, Knute O.; and Brainard, Alanson D. *Planning and Modernizing the School Plant.* Lincoln: The University of Nebraska Press, 1949. p. 1-20.
38. Viles, Nelson E. "Functions and Use of School Plant Codes, Standards, and Guides." *Education in Transition.* Proceedings, Thirty-Fourth Annual Schoolmen's Week. Philadelphia: The University of Pennsylvania, 1947. p. 318-26.
39. Vincent, William S. "Tomorrow's School Building." *School Executive* 67: 25-27; November 1947.

40. WESTBY, CLEVE O. "A Community Plans Its School Buildings." *Educational Leadership* 6: 285-89; February 1949.
41. WHITE, WARREN T. "Planning School Buildings for School Children." *National Education Association Journal* 38: 119, 122; February 1949.
42. WHITEHEAD, WILLIS A. "Education Consultant Service in Planning School Buildings." *Educational Research Bulletin* 26: 179-85, 196; March 1948.
43. WHITEHEAD, WILLIS A., and FEATHERSTONE, RICHARD L. "School Building Survey Technique." *The American School and University*. Twentieth Annual Edition. New York: American School Publishing Corporation, 1948. p. 102-108.
44. WHITEHEAD, WILLIS A., and OTHERS. *A Guide for Planning Elementary School Buildings*. Columbus: Bureau of Educational Research, Ohio State University, 1947. p. 1-33. (Mimeo.)
45. WILSON, WILLIAM K. *Long Range Planning of School Plants*. Cambridge, Massachusetts: New England School Development Council, April 1947. 12 p. (Multilithed)

CHAPTER III

Space and Facility Requirements

JAMES D. MacCONNELL

THE importance of space and facility requirements for elementary and secondary schools has been minimized, to some extent, in the planning phase of schoolhouse construction. This aspect of planning needs to be studied constantly in order that the optimum advantages may be derived from the educational environment of our remodeled or new school buildings. The requirements of space and facilities vary with curriculums, but there are certain features among the activities within the different types of schools which are amenable to standardization.

Due to the somewhat unspecialized nature of the work conducted within the elementary school, the treatment of the problem of interior space and facility requirements in the elementary school is quite general in this chapter. This is in contrast to the more specific nature of the information advanced in treating the specialized requirements of the secondary school. This approach to the subject of space and facility requirements for both the elementary and secondary school is in no way inconsistent inasmuch as the specialized requirements of the secondary- and elementary-school buildings are similar in many respects.

Pertinent information on the size, dimensions, and facility requirements for the various activities of the elementary and secondary school have been reviewed. The proximity of these areas has been treated so that an overview of the more recent trends in space relationships can be shown. Illustrations of functional layouts for these areas provide the application of sizes and dimensions recommended.

The Elementary School

Elementary-School Classrooms

Most school-building specialists, according to the American Association of School Administrators (1), hold that a modern elementary-school program requires 30 square feet per pupil exclusive of storage and accessory spaces, as opposed to the 18 square feet of space per pupil which was presumed sufficient in the past for the traditional school program. Square classrooms are being used on an increasing scale inasmuch as they give evidence of being the most functional type.

Where elementary education has been expanded downward to include the five-year-olds, the kindergarten room should be homelike and attractive and advantageously placed to receive the morning sunlight. The American Association of School Administrators (1) advocated that such rooms be located on the first floor and have their own exits to separate play space. A minimum of 1000 square feet of net floor area, clear of cloak and supply space, was stipulated for 25 to 35 five-year-old children by the American Association of School Administrators (1), altho the National Council on Schoolhouse Construction (31) advocated a minimum of 1200 to 1500 square feet for a like number of five-year-olds.

Elementary-School Equipment

Normally included under this heading at the elementary level are tables, chairs, piano, record player, radio, bulletin board, and ample built-in shelving and cabinet space. In general, the National Council on Schoolhouse Construction (31) recommended movable equipment in the elementary-school classroom rather than fixed equipment. It provides for a greater variety of uses and flexibility of operation. Beard and others (5) suggested that, at least in the lower grades, a fireplace be built in each classroom. With a built-in firescreen for safety, the fireplace with the children grouped around it is reported as being the best suited area for meeting with discussion groups. Window seats in the rooms of the smaller children were also recommended by this group (5). The storage space found beneath window seats is not to be overlooked. Beard and others (5) also recommended that the library center have round tables and plenty of chairs of different sizes. In the classroom no compromise should be made in the selection of desks and seats, according to the National Council on Schoolhouse Construction (31). The contribution to posture and comfort made by carefully chosen desks and seats should not be treated lightly. A sink as standard equipment in each classroom was advocated by the National Council on Schoolhouse Construction (31) which also suggested that a separate work sink be provided in each room. Durable work benches or counters were recommended for each classroom by the same authorities, with provision for tool cabinets, scrap drawers, hardware bins, and space for unfinished projects.

Sixteen to 20 linear feet of tackboard placed at the eye level of pupils using the classroom was indicated as being adequate by the American Association of School Administrators (1). Light colored chalkboards were recommended by the National Council on Schoolhouse Construction (31) in lieu of blackboards. The lighter colored chalkboards meet current demands for good light reflection and avoidance of dark areas in the classrooms. Sixteen to 20 linear feet of chalkboard was considered adequate for the average elementary classroom by the National Council on Schoolhouse Construction (31).

Individual toilet facilities were envisaged by the American Association of School Administrators (1) as being desirable for each classroom all the way thru the sixth grade with the gang toilet being relegated to the past. Beard and others (5) stated that the sight and sound of archaic installations frighten children whereas the family type fixture facilitates control.

Other Elementary-School Facilities

The multipurpose room is one which must be planned with considerable forethought. Special consideration is necessary, according to the National Council on Schoolhouse Construction (31) if such a room is to serve its purpose satisfactorily. The space to be devoted to this particular room is a function of the size of the particular elementary school and the amount of activity anticipated to be scheduled therein. The National Council on Schoolhouse Construction (31) also commented on the advisability of providing the multipurpose room with an outside entrance which would facilitate its use as an independent unit of the school. If extensive use by the community is anticipated, toilet facilities, heating, ventilating, and lighting should be zoned for this area alone.

Space for plant growing and pet keeping is recommended by Beard (5) as is the inclusion of a doll corner for the younger children in their classrooms in the elementary school. The National Council on Schoolhouse Construction (31) reminded its readers that cloakroom facilities need not be separate units except for the kindergarten group. Gang locks for the large wardrobes were recommended (31).

The problem of acoustics is best solved during the planning stage for a building, altho corrective measures may be taken to ameliorate any acoustical shortcomings in the elementary school. If but little consideration can be given the matter of acoustics because of budget limitations or other reasons, the Committee of the Staff of the 16th District Public Schools, Elmont, New York (5), recommended that provision at least be made to have the ceilings and walls of the elementary school absorb as much sound as possible.

Facilities for handicapped children must not be overlooked in planning the elementary school. The visually handicapped child, the pupil with defective hearing, those in need of speech correction, those for whom orthopedic care is prescribed, and the cardiacs require special attention in planning space and facilities. The National Council on Schoolhouse Construction (31) recommended quiet game rooms, reserved play space, special lunch service, and facilities for rest as well as adequate professional care for the handicapped child in the elementary school.

The Secondary School

Art

The American Association of School Administrators (1) indicated that work centers should be set up within the art room such as a clay center, wood center, metal center, and weaving center; and that approximately 30 to 35 square feet of floor space per pupil, exclusive of storage, is needed. The National Council on Schoolhouse Construction (31) supported this opinion and further pointed out that where possible it would be well to locate the art department convenient to the homemaking and general shop units and to provide north light. The combination of north light and artificial illumination should always produce a minimum of 25 to 30 foot-candles on the task surface according to Roessner (36). Special art rooms may be two to three times as large in floor areas as regular classrooms, and the furniture in art rooms must be portable, according to Hanson (18). Some good illustrations and floor plans were given by Ferris (14) which showed the space relationships among all departments as well as the recommended laboratory-type art rooms.

Business Education

Shipley (38) stressed the vital need for flexibility, and the layouts he gave illustrated this important feature. This need was particularly significant in planning a one-room business department according to De Lancey (11), who also gave data on size of room, ventilation, closet space needed, and necessary equipment. Where possible, in the opinion of Freeman (16), the typing and secretarial laboratory should be 27 square feet per pupil; the bookkeeping laboratory, 30 square feet per pupil; and the office practice laboratory, 35 to 40 square feet per pupil. The *Business Teacher* (8) gave a description of a large commercial high school located in the heart of the city of New York, and by means of pictures illustrated the rooms and facilities, and outlined the program offered. Clift (9) recommended a layout for the commercial department and stressed its strategic functional location in relation to the total school plant in showing the floor plans of a new high school in Atlanta, Georgia. The commercial facilities outside the department, as such, are extremely important, according to Hypps (24), and she stressed the utilization of the whole school plant as a laboratory for the commercial department.

General Classrooms

Bursch, Gibson, and Wright (7) pointed out the transition from the old to the new type of classroom, indicating the newer phases of size and equipment. They further indicated that because of the trend toward a learning laboratory, there is need for more floor area per student which in turn leads to the need for nonstructural partitions to facilitate the ease of contracting and expanding room sizes. Van Nuys (43) showed an excellent diagram of classroom construction using demountable partitions which are fire-resistant and sound-proof. To further the flexibility he pointed out that the classroom should use four-foot portable storage units and four-foot portable bookcase units. Some of the major items to be provided for in the modern classroom according to Ittner (25) were (a) acoustically treated ceilings, (b) the proper number of either semi-indirect incandescent or fluorescent fixtures to provide 25 to 30 foot-candles at the task surface, (c) a public address and radio system with controls centered in the administrative group with outlets in each educational unit, (d) provision for present or future television reception, (e) special provisions for audio-visual education, (f) sufficient utility outlets for projection machines and maintenance work, and (g) a heating system that can be thermostatically controlled in each classroom. Newman (33) opposed the theory of acoustically treated ceilings by indicating that treatment of the entire ceiling makes a room overly "dead" and results in increased difficulty for a teacher to speak easily. He went on to point out that: (a) it is important that most of the absorptive treatment applied in a room be on the upper wall area rather than on the ceiling, (b) treatment can extend from the top of the chalkboards to the ceiling which will give much better control of sound than the ceiling treatment, (c) there should be some treatment on each of the three sets of opposite enclosing surfaces, and (d) that it is highly desirable that walls, ceiling, and floor be nonparallel even to only a slight degree which helps eliminate faulty sound distribution and flutter echoes. Progress in this direction can be obtained by tilting the blackboards slightly which also makes for easier writing. In the opinion of Engelhardt, Engelhardt, and Leggett (13) the size, general layout, furniture, and other facilities must be related to the functional demands of the curriculum itself. These authors went on to list definite specifications for chalkboards, chalk and eraser troughs, chart cases, sunboards, shades and curtains, display boards, projection facilities, storage, and equipment. One of the first truly modern secondary schools is the Acalanes High School in Lafayette, California, where, according to the *Architectural Forum* (3), the rooms can be enlarged or decreased in size in 30 minutes by shifting partitions without upsetting the lighting, heating, or wiring in any way. This particular source also stated that the teachers and students expressed a definite feeling of "freedom and lack of inhibition" in this type of structure, and the general teacher attitude can be summed up in the phrase "simplicity is beauty." The City High School in Wayne County, Michigan, described in the *Architectural Forum* (4), is another new school which is quite different architecturally from the Acalanes High School. The American Association of School Administrators (1) concurred in most of the items mentioned above, and further indicated that rooms should be designed and equipped to reflect their use and that it is sometimes desirable to plan departmental rooms *en suite,* including a conference room and special materials library. In small high schools with considerable variation in class size, space utilization can be increased by providing classrooms of different sizes.

Homemaking

According to the American Association of School Administrators (1) all homemaking departments, regardless of size, should have facilities for teaching: (a) selection and purchase of goods and services for the home, (b) maintenance of satisfactory personal and family relationships, (c) selection, preparation, serving, conservation, and storage of food for the family, (d) selection, care, renovation, and construction of clothing, (e) care and guidance of children, (f) selection and care of the house and its furnishings and furniture arrangement, (g) selection, use, and con-

LIBRARY
13.8.70
189

servation of home equipment, (h) maintenance of health and home safety, (i) home care of the sick and first aid, and (j) consumer responsibility and relationships. The National Council on Schoolhouse Construction (31) listed 11 specific work centers and pointed out that there should be a minimum of 30 square feet of net space per student. Some excellent layouts for such work centers were given by Lee (26). Wilkes (46) showed a very good floor plan from the Morningside High School. In selecting equipment for a department the following criteria should be used, according to Wagner (44): (a) equipment should be within the price ranges that students could buy for their homes, (b) equipment should offer students the opportunity to learn the best features of a variety of models, materials, and makes of each item that is given space, and (c) standard and de luxe models should be represented in order that students may be made conscious of the price span.

Industrial Arts

Many of our shops which were built in the 1930's were not originally planned as shops. Quite often any available space was made into the shop. McDermott (28) indicated that the industrial arts laboratory should be designed around the objectives of the program. The choice of media and the methods should be determined by the number of teachers, the appropriate divisions, the number of students, etc. The design of the shops should be functional. Floors, ceilings, and walls, service facilities, and display areas were discussed. Hippaka (21) gave some excellent principles which should be followed in planning a shop. Topics considered were objectives, cooperative planning, site selection, shop units, the individual shop, safety, and color dynamics. He also showed how the shop teacher and the architect should cooperate. Newkirk and Klingensmith (32) listed several items to be considered in planning the shop. The well-planned shop has ventilation, light placement, acoustical treatment, and color dynamics. The size of the shop was stipulated and the number of square feet of floor space per pupil station in each type of shop was specified. Wilber (45) gave some excellent suggestions and precautions which should be considered in planning the shop and gave the details of planning such area. Finsterbach (15) gave specifications for an ideal general shop and discussed the location of facilities and some of the architectural details. Floors, walls, fenestration, ventilation, and color were discussed. Willoughby (47) showed some practical shop layouts for areas and work stations. Van Duzee, Radtke, Barocci, and others (42) gave layouts which show what can be done in various areas. Bollinger (6) had many excellent suggestions for planning industrial arts facilities. He maintained this planning must start with the teacher because this is his job, and he is the expert.

Multipurpose Rooms

Lemmons (27) described a combination gymnasium-cafeteria-auditorium made from Quonset huts at a cost of $6.30 per square foot at the Randolph High School in La Grange, Texas. According to Engelhardt, Engelhardt, and Leggett (13) combinations of auditoriums and gymnasiums, tho economical, are not particularly functional because of the difficulty of combining the purposes of each. These authors pointed out that characteristics which make a gymnasium cannot be made to harmonize with the needs of an auditorium. For example, portable chairs constitute a definite fire and panic hazard. A combination gymnasium, small club room, study hall, and library which was built at the Windsor, Colorado, High School was described and illustrated in the *American School Board Journal* (2). Cochran (10) described a situation in Barrington, Illinois, where black-out drapes at the windows and projector equipment convert the cafeteria into a visual-aid room, and where the faculty dining room becomes a recording laboratory, speech corrective room, or music room by installing acoustical tile, floor-length drapes, and electronic equipment. According to Herrick (19), Cincinnati, Ohio, has designed an elementary community room. This might also serve many functions of the secondary school. Folding doors divide this particular room, providing a smaller section equipped with tables and chairs, a kitchenette unit, and files for the Parent-Teacher Association, while the larger part is used for community group meetings, faculty meetings, a small library, and a teachers' workroom. Huggard (22) described an experiment made in Seattle, Washington, combining auditorium, playroom, gymnasium, and cafeteria into one unit. According to Roessner (35) it is desirable to have any highly-developed multipurpose room near the center of the school plant.

Music

One of the most important points brought out in the literature covered indicated that the music room should be located in close proximity to the auditorium. Higgins (20) gave a very good layout for a music department for a school of 800 students and clearly indicated the space relationship that should exist between units within the department. He stated that 4000 square feet should be allocated to a music department in a school of this size. Engelhardt, Engelhardt, and Leggett (13) presented plans for a choral room, a theory room, and practice rooms. Perkins and Cocking (34) showed plans for a rehearsal room as the core of this department. A high ceiling of from 12 to 15 feet was recommended. Small practice rooms should be 8 feet by 10 feet or 10 feet by 12 feet. The American Association of School Administrators (1) discussed the desirability of having the music room near the auditorium and discussed the size of steps for a rehearsal room. The minimum width of the steps should be 48 inches, and 36 inches of lateral space should be allowed for each seating. Sixty to 80 square feet for practice rooms was recommended.

The National Council on Schoolhouse Construction (31) concurred with the ideas stated above in regard to the location of the music room, size of rooms, storage space, and practice rooms. There seems to be little disagreement as to the space and facility requirements for the music department.

Physical Education

Huggard (23) discussed the planning of the Overlake High School in Bellvue, Washington. Ultimately, the plans considered the needs of 1600 pupils. The plant was to be partially constructed for 400 pupils; expanded for 800; and again for 1600. The auditorium and gymnasium were planned separately. The fact that the gymnasium would be constructed first and used as a combination auditorium-gymnasium was considered a poor feature. The gymnasium seats 4000 when used as an auditorium and accommodates over 2000 spectators for basketball. Griffin (17) showed an unusual floor plan for a new gymnasium with an adjoining band room in Teutopolis, Illinois. Woodruff (48) gave a concise but complete report on material fixtures, and equipment recommendations for an orthopedic unit, which includes layout, dimensions, and space requirements. Monnier (29) presented a floor plan and picture of the Orchard Park High School, New York. He discussed a gymnasium which includes offices, boys' and girls' locker rooms, boys' team room, trainers' room, storage rooms, corrective exercise room, and folding doors to divide the main playing area. Glass brick was used to provide natural light. Sleeper (39) gave reasons why the new gymnasiums will tend to be larger. He told how to plan space utilization and gave rules to use in estimating needed seating capacity. He also pointed out the need for more teaching stations and showed how to attain them in the construction of the building. Murray (30) said that equipment rooms should be definitely planned, rather than using left-over space or damp dark corners. Seaton (37) discussed the safety features which should be incorporated into the construction of a gymnasium or a field house. Items such as the space around courts, walls, acoustical treatments, stairs and ramps, bleachers, storage space, and service rooms were included.

Science

Engelhardt (12) indicated that science facilities have shown a trend in recent years toward greater concentration upon general science equipment. The National Council on Schoolhouse Construction (31) pointed out that the science rooms must make provision for lecture facilities, demonstration, recitation, experimentation, and audio-visual teaching aids. Types of facilities being used are (a) separate rooms for lecture, demonstration, laboratory work, and experimentation, (b) a laboratory with one section equipped for experimentation by students and the other section of the same room equipped with seats and a demonstration desk for recitation, lecture, and teacher demonstration, (c) a laboratory equipped with science tables facing one way so the entire room may be used for all activities, and (d) a flexible laboratory with fixed science tables, except the demonstration table, arranged around the walls. The demonstration table and pupil desk chairs should be located near the front of the room and movable work tables should be near the rear of the room. Perkins and Cocking (34) said that the general science laboratory challenges design ingenuity. They gave a minimum space requirement of 35 square feet per pupil, and indicated that altho flexibility is required in a good science department, it is hard to achieve. Engelhardt, Engelhardt, and Leggett (13) also emphasized flexibility. A greenhouse for plant life was recommended for botany. Separate lecture or demonstration rooms or separate preparation rooms are not too desirable because of the low utilization of space. The American Association of School Administrators (1) advocated that plans for rooms and equipment should be based on careful plans for the science program. They listed three general types of science facilities: (a) one room for lecture and demonstration and another room for laboratory work and experimentation, (b) a laboratory with one section for student experiments and one for teacher demonstration, and (c) a laboratory with a demonstration desk and pupil science tables which are used for recitation, demonstration, or experiment. Stoneman, Broady, and Brainard (41) gave minimum space requirements for science rooms. They listed equipment and facilities, and discussed storage spaces.

Cooperation with Architects

Two ways to indicate space requirements were discussed by Smith (40): one was by area or dimension, and the other was by the function and capacity. It may be seen that the architect has greater freedom with the second method. Pupil capacity or simply the number of student stations to plan for allows greater possibilities. Smith (40) also said that the schoolman should help the architect in correlating spaces, and in grouping departments or cooperating areas. The proximity of certain rooms and facilities may be "mandatory," "desirable," or "optional."

The functions and the objectives should be stated. Close cooperation between the teacher and the architect should produce the best results. Both are experts, but in different phases of the planning program.

Bibliography

1. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *American School Buildings.* Twenty-Seventh Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. 525 p.
2. AMERICAN SCHOOL BOARD JOURNAL. "Adapting the School Plant to Broader Service." *American School Board Journal* 115: 49-50; September 1947.
3. ARCHITECTURAL FORUM. "Pioneer School." *Architectural Forum* 91: 104-106; October 1949.
4. ARCHITECTURAL FORUM. "City High School." *Architectural Forum* 91: 129-31; October 1949.

5. BEARD, CORA; BRADSHAW, BARBARA; D'EVELYN, KATHERIN; SMITH, MARY; SPELLANE, MARILYN; and WHITE, SARAH. "Elementary School Classroom Design and Equipment—Specifications of Teachers." *The American School and University.* Eighteenth Annual Edition. New York: American School Publishing Corporation, 1946. p. 203-208.
6. BOLLINGER, ELROY W. "Suggestions for Planning Industrial Arts Facilities." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 211-20.
7. BURSCH, CHARLES; GIBSON, CHARLES D.; and WRIGHT, HENRY L. "Classroom Size." *School Executive* 68: 26-27; January 1949.
8. BUSINESS TEACHER. "Business Teacher Visits the School Amid the Skyscrapers—New York's Central Commercial High School." *Business Teacher* 1: 270-71; March 1950.
9. CLIFT, THOMAS W. "High School in Atlanta—Conservative Modern." *Nation's Schools* 43: 31-32; March 1949.
10. COCHRAN, LEE. "Multiple Use of Space." *School Executive* 68: 56-57; January 1949.
11. DELANCEY, OPAL H. "Twenty-Five Suggestions on Planning the One-Room Business Department." *Business Teacher* 1: 192; March 1950.
12. ENGELHARDT, NICKOLAUS L. "Changes in Secondary School Buildings." *School Executive* 42: 25; August 1949.
13. ENGELHARDT, NICKOLAUS; ENGELHARDT, NICKOLAUS, JR.; and LEGGETT, STANTON. *Planning Secondary School Buildings.* New York: Reinhold Publishing Corporation, 1949. 252 p.
14. FERRIS, LEHMAN A. "Planned for a 16 Hour Day." *Nation's Schools* 40: 43-47; August 1947.
15. FINSTERBACH, FRED C. "Toward the Ideal General Shop." *Industrial Arts and Vocational Education* 39: 104-106; March 1950.
16. FREEMAN, M. HERBERT. "The Good Business Education Department Is Adequately Housed and Equipped." *National Business Education Quarterly* 18: 35-43; Winter 1949.
17. GRIFFIN, JOHN H. "Deluxe Model Gym." *Scholastic Coach* 19: 10-11; January 1950.
18. HANSON, ABEL. "Facilities for Art Experience in General Education." *California Journal of Secondary Education* 23: 279; May 1948.
19. HERRICK, JOHN H. "Cincinnati Plans Schools for Community Use." *Nation's Schools* 40: 34-36; July 1947.
20. HIGGINS, THOMAS J. "Making Room for Music." *Nation's Schools* 42: 39-40; November 1948.
21. HIPPAKA, THOMAS A. "Planning School Shops." *Industrial Arts and Vocational Education* 38: 91-95; March 1949.
22. HUGGARD, FRANCIS. "The Transportable School." *Nation's Schools* 42: 38-40; August 1948.
23. HUGGARD, FRANCIS. "Make No Little Plans." *School Management* 19: 4-6; June 1950.
24. HYPPS, IRENE C. "Your School Is a Business Laboratory." *School Executive* 67: 34-35; March 1948.
25. ITTNER, WILLIAM B. "How Shall We Plan and Maintain the School Plan?" *Bulletin of the National Association of Secondary-School Principals* 34: 54-59; March 1950.
26. LEE, ATA. "Homemaking Suites." *School Executive* 68: 68-69; January 1949.
27. LEMMONS, CHARLES A. "Economy Without Sacrifice of Principles of Lighting, Decoration, Color, Heating, and Ventilation." *Nation's Schools* 46: 44-47; July 1950.
28. MCDERMOTT, JAMES R., JR. "Design the Industrial Arts Laboratory Around Objectives." *School Executive* 67: 29-30; October 1947.
29. MONNIER, DWIGHT C. "Orchard Park's New Schools." *Athletic Journal* 30: 16-17, 49-50; June 1950.
30. MURRAY, FRANK J. "The Equipment Room." *Scholastic Coach* 19: 14-56; January 1950.
31. NATIONAL COUNCIL ON SCHOOLHOUSE CONSTRUCTION. *Guide for Planning School Plants.* Nashville, Tennessee: George Peabody College for Teachers. 1949. 173 p.

32. NEWKIRK, LOUIS V., and KLINGENSMITH, WILEY P. "Planning the Industrial Arts Shop." *Industrial Arts and Vocational Education* 36: 374; November 1947.
33. NEWMAN, ROBERT B. "Acoustics." *Architectural Forum* 91: 152-53; October 1949.
34. PERKINS, LAWRENCE B., and COCKING, WALTER D. *Schools.* New York: Reinhold Publishing Corporation, 1949. 264 p.
35. ROESSNER, R. GEMMEL. "The Planning of the Group Instructional Unit." *American School Board Journal* 119: 32; August 1949.
36. ROESSNER, R. GEMMEL. "The Planning of Large Group Instructional and Servicing Elements." *American School Board Journal* 119: 68; January 1950.
37. SEATON, DON CASH. *Safety in Sports.* New York: Prentice-Hall, 1948. 415 p.
38. SHIPLEY, CLIFFORD B. *A Handbook for Business Education in the Small High School.* Monograph No. 69. Cincinnati: South-Western Publishing Company, 1948. p. 45-51.
39. SLEEPER, HAROLD R. "Space Utilization and Gym Seating." *Scholastic Coach* 19: 18, 20, 22; January 1950.
40. SMITH, HOWARD DWIGHT. "What the Architect Expects of the Client." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 39-42.
41. STONEMAN, MERLE A.; BROADY, KNUTE O.; and BRAINARD, ALANSON D. *Planning and Modernizing the School Plant.* Lincoln; University of Nebraska Press, 1949. 328 p.
42. VAN DUZEE, ROY R.; RADTKE, ROY; BAROCCI, LOUIS; and OTHERS. "Shop Layouts of Various Kinds." *Industrial Arts and Vocational Education* 37: 90-97; March 1948.
43. VAN NUYS, JAY C. "Flexible Interiors." (Reprint) *School Executive* 68: 54-55; January 1949.
44. WAGNER, FLORENCE E. "A 'Custom-made' Laboratory." *Journal of Home Economics* 40: 446; October 1948.
45. WILBER, GORDON O. *Industrial Arts in General Education.* Scranton, Pennsylvania: International Text Book Company, 1948. Chapter 17.
46. WILKES, RICHARD M. "Architectural Features of the Morningside High School Plan." *American School Board Journal* 120: 43-45; May 1950.
47. WILLOUGHBY, GEORGE A. "Practical Shop Layouts for Areas and Work Stations." *Industrial Arts and Vocational Education* 38: 88-91; March 1949.
48. WOODRUFF, C. H. "Plan and Equipment Standards for Orthopedic Units." *American School Board Journal* 116: 28; January 1948.

CHAPTER IV

Trend in Materials and Design

ARCHIE L. GRAY and JERALD BLAKE

Recent trends in materials and design in school construction are the reflection of the changing needs of education. The many problems which arise in planning a functional, economical school building, varied in its uses to the community, call for cooperation among boards of education, architects, school staffs, and communities in the evaluation of these trends.

Because of the recent increase in the birthrate many classrooms are needed to provide space for rapidly increasing enrolments in the elementary schools. Enrolments in the secondary schools will show a similar increase in a few years. There is also the long-range need to design school buildings that will be flexible in their purpose if enrolments decrease or change. Unpredictable shifts in population continue to have a very great effect upon school-building needs. The schools must be designed to meet these changing needs.

School and College Management (32) reported the recent convention of the Association of School Business Officials at which Kenneth Stowell stated the main points to remember in school construction. They included (a) simplicity of design, (b) elimination of unnecessary items, (c) integration of design and materials for the sake of economy and suitability, (d) standardization of the elements of the plan to prevent waste, (e) factory fabrication to reduce time and cost, and (f) new materials and methods of construction to meet community needs efficiently.

Regardless of how much school administrators may feel the need to save money on building construction, they are obligated to design and maintain buildings that are structurally safe (27). The use of materials that are fire-resistant is imperative (41). The schools should also provide protection for the health of the pupils and the teachers by the installation of adequate service systems such as lighting and sanitation.

The rapid trend toward the one-story school is due largely to its integration of good design with safe construction and functional use. This type of construction provides less danger from such hazards as fire, tornado, and earthquake. Expensive foundations, fire proofing, and panic escape requirements for multi-story schools would seem to offset advantages gained in other ways.

Since World War II, school-building construction has been handicapped considerably by shortages of materials. Rice (31) stated that the National Conference for Mobilization of Education has asked the National Production Authority to set mandatory priorities on certain necessary school-building materials. It is hoped that this conference, composed of representatives of 83 groups interested in our nation's schools, will be able to convince the government that priorities for school-building materials should be second only to defense materials.

There is a growing tendency to use modular construction in school buildings. When the dimensional coordination of building materials develops further, the cost of erecting schools will be reduced, because of the decreased need for on-site labor. In the field of prefabrication, there is already extensive premanufacturing and precasting of materials into larger elements of floors, walls, ceilings, roofs, and finish. Because of the rapidity with which they can be installed or dismantled for erection elsewhere, the popularity of prefabricated buildings has grown rapidly since World War II. They have filled the urgent need for more space, but their widespread use as permanent buildings is not feasible until mass production lowers present costs.

There is increasing emphasis on the belief that the school should be constructed of good materials with simplicity of design. Less stress should be placed on the idea of creating an impressive effect with expensive exterior ornamentation or huge auditoriums and gymnasiums which are used infrequently by the school. If these out-size rooms are included in the school structure, their use and cost should be shared with the community. The primary consideration of the groups who control school planning should be to provide space and facilities sufficient for the daily needs of the pupils and the teachers. Almost without exception schoolmen have recognized the need for larger classrooms.

Design

The continuing trend toward functional design to fit the modern educational program has produced many changes in school planning. Noteworthy developments in functional design are the tendency toward larger school sites with ample space for recreational and educational areas; and the tendency toward L-shaped, finger type, or even campus-plan, one-story buildings. There has been a prevailing idea that there is still plenty of land on which to erect modern one-story schools, but according to Haskell (22) it is an erroneous idea when applied indiscriminately to any large city. Many cities either cannot find such a large site that is at all reasonable in cost, or if they can it is likely to be a rocky, irregular slope. In seriously congested districts, the two- or three-story school is the only possible answer to the problem. Pangburn (29) stated that even where plenty of land is available, proximity of a park to a school site is both useful and economical.

Several writers described the trends in design which have impressed them. Engelhardt (18) described functional spaces, playground and garden areas for kindergarten and primary grades. Mitchell (26) recommended: (a) more free floor space, (b) plenty of open bookcases, (c) movable desks, (d) tables, (e) wall space for maps, (f) electrical outlets, and (g) sinks for classrooms. Viles (39) discussed the measuring of school-building utilization and advocated the use of the pupil station unit as being useful and accurate in designing instructional spaces. Hamon (21) stated that there are trends in new designs toward providing larger sites, larger teaching areas, facilities for convenient storage, better seeing conditions, one-story plans, and maximum flexibility and expansibility. Viles (40) stated that the plant must be a convenient and attractive tool. He stressed simplicity, plenty of space and facilities, and provision for the health and well-being of children.

Adams (1) stated that provision for large classrooms and space for activities should come first. He suggested saving by: (a) eliminating basements, (b) building schoolhouses on concrete slabs covered with asphalt tile, (c) using trussed roofs with which bearing partitions may be eliminated, and (d) using better acoustical materials whereby thinner walls may be made possible. He desired more homelike classrooms, movable chairs, cheerful wall colors, and colored asphalt tile floorings. He suggested the use of wings with bilateral lighting to improve classroom lighting. Administrative quarters, assembly areas, and gymnasiums should be located so as to be easily accessible to the street, and so that they may be serviced separately for activities not requiring the whole building.

Cyr and Linn (15) supervised the preparation of a series of plans depicting modern design for school buildings and rooms for classes and other activities to be used in rural communities.

In the *School Executive* for January 1949, a number of outstanding authorities made exceptional contributions which provide an organized treatment of school-building design for the entire school-plant area. In a section on trends in types of units, Stanhope (36) noted the general trend toward horizontality and single-story construction. He illustrated nine advantages of this type of school-building design. Cherry (10) illustrated two small schools: (a) a neighborhood primary school adapted to the needs of little children, and (b) a rural school with almost every space adaptable to multiple use. Engelhardt (19) described a home-school unit designed to supplement the elementary school, and also adaptable to use as the first stage of a complete elementary school. Leggett (24) presented a community school functionally planned thru the cooperation of the school staff, community representatives, architects, and educational consultants. He described five functional areas.

In a section on structural design, Smith (35) dealt with trends concerning the interrelationships of spaces in school-plant design. He included relationships between: (a) the school site and the community, (b) the building and the site, (c) the departments within the school, (d) the spaces within the department, (e) the spaces within the individual rooms, and (f) structural materials in three types of classrooms. Caudill (9) pointed out four strong current trends in structural designs and materials. He predicted greater use of: (a) repetitive rigid frame, structural units of steel, wood, or concrete; (b) light, thin removable nonload bearing partitions; (c) fewer and larger prefabricated units of construction; and (d) speedy erection technics to reduce labor by assembly line methods.

Van Nuys (38) stated that to achieve flexibility within the building, it is necessary to design lighting, ventilation, fenestration, and structure on a modular basis. Cochran (14) illustrated the multiple use of spaces for different parts of the educational program and for community purposes. Bursch, Gibson, and Wright (8) advocated: (a) more floor area per student, (b) a more efficient use of all available space, and (c) modular construction using nonstructural partitions.

In a section on physical well-being, Clapp, Gibson, and Wright (12) discussed the relation of design to classroom lighting showing how to achieve controlled and balanced brightness with natural and artificial lighting. They presented illustrations of one- and two-story designs with single- and double-loaded corridors. Essex and Gilson (20) advocated simple ventilation, using principles of design rather than intricate and expensive equipment.

De Shaw (16) classified trends in the development of school sites as more acreage per school, greater utilization of sites, and community and school use of property.

Multipurpose Design

A series of articles in the *Architectural Forum* for October 1949, by the editors and other leading authorities, dealt comprehensively with the school-plant problem. It was noted that present educational philosophy stresses the need for spaciousness in a classroom. It was predicted that more medium-sized schools would be constructed and fewer large or very small schools. It was stated that the road toward better schools is thru long-range functional planning, integration of design and engineering, industrialized building, multiple-use of space, building code modernization, and new plan types.

The *Architectural Forum* (4) stated that, while former standards called for 15 square feet per pupil, the current desired requirement is 30 square feet. A trend was noted toward rooms that are about 30 feet square. A room with these dimensions provides 30 square feet each for 30 children. A square room is economical because it offers the greatest area with the least building material. This shape of area is flexible because it may be subdivided easily without partitions into a rectangular main recitation area, and two narrower rectangular spaces suitable for activities. Such subdivision would be aided by movable storage cabinets.

A multimodular design was described with a 16-foot structural module, four-by-four floor and partition module and a two-by-two foot ceiling module. This design would provide for greater flexibility and ease of maintenance and repair by keeping structural components, partitions, storage cabinets, and services mutually independent. Such integration of design would also allow repairs or changes in one or more of the elements without destroying the effectiveness of the others.

The *Architectural Forum* (3) described a situation which could be duplicated on the outskirts of almost any city. A new residential neighborhood was built up by young married people. Soon there was a demand for elementary schools, later for secondary schools, then for neither as the people grew older. If designed flexibly a school building could be used first for elementary, then secondary grades, and finally dismantled for erection elsewhere for school or for industrial use.

In a similar example of the evolutionary use of a school, Shunck (33) told about an all-purpose building which was designed to be used successively to house senior high-school students, later to provide space for high-school shop, music, administration offices, and finally to become a center for district-wide administration, supply, maintenance, and bus storage and repair.

The *Architectural Forum* (5) continued by describing three multi-use corridors: (a) a single-loaded type which was widened to allow for workroom alcoves opposite the classrooms with an open cafeteria at one end, (b) a double-loaded type having the widened interior between two rows of classrooms serve for exhibits, recreation, lounging, or lunch depending on the time of day, and (c) a combined multi-use room and corridor in the middle of a round type plan. Other multiple uses of special areas were indicated by the *Architectural Forum* (7). In the *Architectural Forum* (6) a description of a method of combating shifting needs for buildings by using a transportable school which was more than just a demountable building was reported.

Clapp (11) concluded that while building codes doubtless are necessary to prevent the construction of unsafe structures by incompetent or unethical designers or builders, they should not contain rigid restrictions which hamper or prevent worthwhile developments in design. He defended the one-story school by saying that it is safe, economical, and provides easily for the isolation of disturbing (to others) activities, and for adequate daylight in wider classrooms. He praised the National Council on Schoolhouse Construction for this organization's work on the revision of the *Guide for Planning School Plants*.

Nowicki (28) has challenged the imagination by presenting plans of two buildings embodying much advanced design including compact plan, short periphery, short communication lines, and multi-use of spaces. One was based upon the repetition of a standard bay which may be constructed of wood, steel, or concrete. The other was a circular plan which may circumvent previous engineering difficulties by using the technic of pouring concrete roof slabs on the floor and raising them hydraulically into place. Nowicki described a design by which plastic bubbles inserted in the roof provided diffused top lighting.

Materials

Altho wood, concrete, steel, glass, and brick are still being used more than other products, new materials are competing with the old in the fabrication of many parts of the school buildings. Many of the materials in use are not entirely new but incorporate improved combinations or different applications of known materials. By using various substitute ingredients such as cinders, slag, light-weight aggregates, or vermiculite concrete blocks, have been given new qualities such as lightness, strength, hardness, or insulating properties. By finishing the blocks themselves, costly layers of other materials have been eliminated. Plastics are being combined with industrial wastes or other fillers to make materials for use as plastic tile flooring, composition boards, and table tops.

Stoneman, Broady, and Brainard (37) stated that in addition to the use of older materials of wood, metal, and ceramics, plastics have been used increasingly for interior trims and many minor purposes. They also stated that penetrating seals and oil paints are still the most satisfactory materials for floor finishes and paints. Smith (34) discussed material from the standpoint of five factors which influence selection of materials: (a) initial cost, (b) ease of maintenance, (c) acoustical properties, (d) light reflecting properties, and (e) adaptability for flexibility. He presented two tables concerning the properties and uses of materials. In the first, he rated many materials according to eight properties, and in the second, he gave ratings to the materials for use in various types of rooms.

Johnson (23) stated that materials have a profound influence on design. He discussed the costs of exterior materials and indicated that materials should be selected from the standpoint of economy, availability, and speed of construction. Clark (13) stated that schoolmen should consult school-building indexes so that they will not be deceived by unjustified increases of bids which have a tendency to rise faster and farther than actual costs of material and labor. The greater efficiency and speed apparent in presentday methods and procedures should tend to keep school-building costs down.

Linn (25) classified types of floor materials as wood, masonry, and resilient composition and gave many examples of each. He listed 12 points to use in the selection of materials. He discussed where and how to use and maintain different types of floor materials. Engelhardt, Engelhardt, and Leggett (17) devoted a chapter of their book to a comprehensive treatment of interior materials, floor and wall finishes, and doors for all types of buildings. Perkins and Cocking (30) used several sections of their recent book for the discussion of design and materials for floors, roofs, and structure. The American Association of School Administrators (2) gave a chapter in *American School Buildings* to materials and construction in relation to utility. It was stated that materials should be selected with a view toward ease of maintenance, and that wherever possible materials indigenous to the area should be chosen. Experience with materials for various purposes in school building was reviewed. The review included sections on materials for different floors, interior and exterior walls, windows and exterior doors, and acoustical treatment.

Bibliography

1. ADAMS, BARCLAY. "Architects Fit Modern Ideas to Old Buildings." *School Executive* 69: 49-50; November 1949.
2. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *American School Buildings.* Twenty-Seventh Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. 525 p.
3. ARCHITECTURAL FORUM. "Toward Better Schools—Through Industrialized Building To Meet a Perpetual Emergency." *Architectural Forum* 91: 100; October 1949.
4. ARCHITECTURAL FORUM. "Toward Better Schools—Through Integration of Design and Engineering To Make Life Easier for Management, Teacher and Child." *Architectural Forum* 91: 98-99; October 1949.
5. ARCHITECTURAL FORUM. "Toward Better Schools—Through Multi-Use of Space To Multiply the School Dollar's Buying Power." *Architectural Forum* 91: 101; October 1949.
6. ARCHITECTURAL FORUM. "Transportable School." *Architectural Forum* 91: 138-39; October 1949.
7. ARCHITECTURAL FORUM. "Special Areas." *Architectural Forum* 91: 154-55; October 1949.
8. BURSCH, CHARLES W.; GIBSON, CHARLES D.; and WRIGHT, HENRY L. "Classroom Size." *School Executive* 68: 58-59; January 1949.
9. CAUDILL, WILLIAM W. "Structural Design and Materials." *School Executive* 68: 52-53; January 1949.
10. CHERRY, RALPH W. "Small Schools." *School Executive* 68: 40-41; January 1949.
11. CLAPP, WILFRED F. "Toward Better Schools—Through Building Code Modernization To Permit Desirable Progress in School Design and Construction." *Architectural Forum* 91: 102, 170, 174; October 1949.
12. CLAPP, WILFRED F.; GIBSON, CHARLES D.; and WRIGHT, HENRY L. "Lighting." *School Executive* 68: 78-79; January 1949.
13. CLARK, HAROLD F. "School Building Costs and Bond Prices." *School Executive* 69: 40; August 1950.
14. COCHRAN, LEE. "Multiple Use of Space." *School Executive* 68: 56-57; January 1949.
15. CYR, FRANK W., and LINN, HENRY H. *Planning Rural Community School Buildings.* New York: Teachers College, Columbia University, 1949. 162 p.
16. DE SHAW, ELTON R. "Grounds." *School Executive* 68: 84-87; January 1949.
17. ENGELHARDT, NICKOLAUS L.; ENGELHARDT, NICKOLAUS L., JR.; and LEGGETT, STANTON. *Planning Secondary School Buildings.* New York: Reinhold Publishing Corporation, 1949. 252 p.
18. ENGELHARDT, NICKOLAUS L. "Cooperative Planning of Physical Education Facilities for San Francisco." *School Executive* 69: 42-44; March 1950.
19. ENGELHARDT, NICKOLAUS L., JR. "The Home-School Unit." *School Executive* 68: 42-43; January 1949.
20. ESSEX, DON L., and GILSON, FRANK C. "Heating and Ventilation." *School Executive* 68: 80-81; January 1949.
21. HAMON, RAY L. "School and College Building Crisis." *School Life* 31: 12; October 1948.
22. HASKELL, DOUGLAS. "Second Thoughts on Forum's October Reference Number." *Architectural Forum* 91: 98-99; December 1949.
23. JOHNSON, WILLIAM A. "Economy in Schoolhouse Planning." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 46-54.
24. LEGGETT, STANTON. "The Community School." *School Executive* 68: 44-45; January 1949.
25. LINN, HENRY H. "Floors for Educational Buildings." *The American School and University.* Nineteenth Annual Edition. New York: American School Publishing Corporation, 1947. p. 106-11.
26. MITCHELL, MARY A. "Classrooms Need Movable Equipment." *School Executive* 69: 61-63; November 1949.

27. NATIONAL COUNCIL ON SCHOOLHOUSE CONSTRUCTION. *Guide for Planning School Plants.* Nashville, Tennessee: the Council, 1949. 173. p.
28. NOWICKI, MATHEN. "Forum's School for 1950." *Architectural Forum* 91: 134-38; October 1949.
29. PANGBURN, WEAVER W. "Modern Design in the School Plant." *Scholastic Coach* 17: 9-11, 64-65; January 1948.
30. PERKINS, LAWRENCE B., and COCKING, WALTER D. *Schools.* Progressive Architecture Library. New York: Reinhold Publishing Corporation, 1949. 264 p.
31. RICE, ARTHUR H. "Defense Importance of Education and Health Requires Mandatory Priorities for Critical Materials." *Nation's Schools* 46: 49-50; December 1950.
32. SCHOOL AND COLLEGE MANAGEMENT. "Design and Material for Good, Economical School Buildings." *School and College Management* 20: 26-27; November 1950.
33. SHUNCK, WILLIAM. "The Superintendents' Story." *Nation's Schools* 46: 54-57; December 1950.
34. SMITH, EBERLE M. "Interior Walls in School Buildings." *The American School and University.* Nineteenth Annual Edition. New York: American School Publishing Corporation, 1947. p. 86-92.
35. SMITH, EBERLE M. "Interrelationship of Spaces." *School Executive* 68: 46-51; January 1949.
36. STANHOPE, ALLAN B. "One-Story Buildings." *School Executive* 68: 37-39; January 1949.
37. STONEMAN, MERLE A.; BROADY, KNUTE O.; and BRAINARD, ALANSON D. *Planning and Modernizing the School Plant.* The Small School in Action Series. Lincoln: Teachers College, University of Nebraska, 1949. Chapter 11, "A Look Ahead," p. 315-22.
38. VAN NUYS, JAY C. "Flexible Interiors." *School Executive* 68: 54-55; January 1949.
39. VILES, NELSON E. "Measuring School Building Utilization." *School Executive* 68: 62-64; September 1948.
40. VILES, NELSON E. "Adequate Housing and Modern Education." *School Life* 31: 1-2, 11; February 1949.
41. WINGATE, HENRY L. "Your School Is as Fire-Safe as You Make It." *School Executive* 69: 87-89; April 1950.

CHAPTER V

Mechanical Facilities

JOHN H. HERRICK and PAUL W. SEAGERS

During the period covered by this review, there has been continued high interest in problems of school lighting and somewhat lesser emphasis on other mechanical facilities. School sanitation in particular has received little attention. The majority of the articles in the educational literature dealing with all mechanical facilities was exhortatory or descriptive of some prevailing practice; very little critical research was reported.

School Lighting in General

So many factors enter into the evaluation of good visual environment that our methods of evaluation need considerable refinement. Considerable research is now being carried on by the members of the Illuminating Engineering Society and the National Council on Schoolhouse Construction as well as by many private corporations. This constant evaluation and criticism of old methods and procedures is bound to make for better schoolroom lighting. Folsom and Biesele (29) pointed out some of the problems encountered in making accurate measurements and have gone so far as to suggest newer methods and instruments for making measurements. Darley (24) suggested that reflected glare reduces the visibility of the task. He stated that both reflected glare and imperfect binocular fixation can be improved by: (a) lower source brightness, (b) lower candle power from the contributing source area, (c) increased task brightness, and (d) improved task characteristics. Luckiesh (48, 49, 50) stated that the threshold foot-candle level depends on the individual, on the task, and on the seeing conditions. He expressed the opinion that we should have lighting conditions much better than the threshold levels; however, he doubted whether we could ever reach ideal levels. He expressed great interest in light and vision as tools of performance for seeing, and gave basic consideration to the border line between comfort and discomfort in visual field brightnesses. Allphin (1) made an intensive study of the brightness engineering calculations as set forth by Harrison, Moon, Spencer, and Logan. Tinker (69) was very critical of the standards now used for effective and easy seeing. He claimed that psychologists should have been brought into the determination of these standards. He also said that frequently the high intensities that have been prescribed have been surplus intensities rather than useful intensities. Hoffman (34) supported Tinker's theories and criticized both the experimental and statistical technics which have been used in arriving at the high standards we now have. Birren (17), a color specialist, criticized the theory of uniform brightness and claimed that deep tones are not only decorative but a definite aid to acuity. He took issue with the Illuminating Engineering Society on their present standards. Bitterman (16) claimed that existing lighting standards were on unstable ground and that we need much more research. He went definitely into the problems of visibility as related to readability. Likewise, Almack (3) criticized current architecture and lighting standards as not being a product of specific investigation. The same holds true for Winkler and Neidhart (78); however, much of their criticism was directed to the louvers of the lighting fixtures.

The September 1948 issue of *Illuminating Engineering* (36) gave the American Standard Practice for lighting schoolrooms. Essex (27) discussed rather fully all phases of general lighting including construction, room arrangement, and decoration and gave good examples of the application of the American Standard Practice. Gibson (31) gave a practical method for teachers to use in checking their lighting conditions and made suggestions for the remedy of the defects. Kahler and Meacham (39) made a strong plea for correlation of brightness ratios and decoration. They stressed that the decorator consider contrast in both color and brightness to establish character of design. They insisted that we must have more coordination between the lighting engineer and the decorator with perhaps some compromise on the part of each. Moon (51) presented an interesting discussion on the use of luminous ceilings, louvered ceilings, diffusing globes, troffers, and other types of lighting. He suggested that regardless of what type of lighting is used the decorations are extremely important. Logan (46) discussed the distribution of light in the field of view, subdividing this field of view into both the upper and lower glare zones. His formulas were based upon this subdivision. Seagers (63) incorporated in a bulletin principles of good practice and showed the need for the coordination of the efforts of the color specialists with the lighting engineers. This bulletin includes reports from the participants of the Indiana Illumination Conference of 1950. Spencer (65) described the relighting of three rooms in Tufts College. She gave a highly technical but interesting treatment. According to Nickerson (53) more attention should be given to the Munsell value scale of colors, because brightness of color alone cannot adequately give all the desirable qualities of that color.

Altho it is rather risky to attempt to judge illumination in terms of pupil achievement, nevertheless a number of individuals have undertaken to do so. Two of the most interesting discussions of this point were made by Allphin (2) and Turner and Brainerd (71).

Natural Lighting

Natural lighting is frequently considered expensive to get into a room and expensive to control after it is there. Nevertheless it is recognized that some natural lighting is desirable for rooms that house children for any length of time. Schmidt (61) gave an interesting account of an engineering study of a well-lighted classroom, while Kump (40) explained the various methods of bilateral lighting, including clerestory methods of getting better and more daylight. Johnson (38) was interested in the monitor-type roof for economical daylight. Gibson (30) explained the difference between daylight and sunlight and said that even on dull days we usually have enough foot candles or foot lamberts of daylight in all localities if we only know how to use them. Biesele (14) went into a thoro explanation of the newer developments of daylight in classrooms. Benford (11) explained the duration and intensity of sunshine. His explanation contributed valuable material and gave many interesting architectural applications. In an excellent article on glass block, Viles (74) attempted to evaluate some of the work by Hugh Paul.

Planned Lighting

Walters (76) showed how existing conditions in schoolrooms can be improved by a little careful study and the application of principles now known. Tinker (70) stressed the margin of safety above critical seeing. Sharp (64) pointed out some of the inconsistencies of standard practices and drew attention to the over-all planning of lighting. He felt that reflected glare is frequently ignored in trying to obtain high quality lighting. Putnam (59) gave an interesting explanation of the history and the development of the American Standard Practice for Schoolrooms. Putnam (58) also showed how specific lighting installations had been set up and indicated the results of meeting recommended standards. Pearson (54) made a study of the plastics and told how they could be used for decorative effects in connection with lighting. Moon and Spencer (52) gave an explanation of methods for determining the lighting from luminous ceilings. Kuntz and Sleight (42) showed the significance of higher lighting levels for subnormal acuity as contrasted with those with normal acuity. This has many implications for setting up sight-saving rooms. Fallon and Allphin (28) discussed the model classroom, using a combination of planned lighting and louvers for daylighting. Darley (23) traced the development of quality in lighting, especially in connection with the increased glare associated with increased foot candles. He also gave a useful explanation of the brightnesses of the different types of fluorescent fixtures from different angles. The use of louvered ceilings was championed by Potter and Oetting (56). Benson (12) also gave a critical discussion of the use of the louvered ceiling. Recent developments in the luminous ceiling were discussed at great length by Beckwith, Peterson, and Moon (10), Spencer (66), and Benson and Church (13). These discussions indicated a new trend in school lighting once the cost of the luminous ceiling is brought down to a figure comparable with the ordinary lighting fixture.

Cold cathode lighting has been much discussed for the past several years. Two of the most interesting articles were written by West (77) and Lewis (43). West's article gave many good characteristics of cold cathode lighting, while Lewis' article indicated different types of installation. Cold cathode lighting is still in the experimental stage so far as general schoolroom use is concerned, unless protected by louvers. Harrison and Meaker (32) developed some new glare ratings including formulas which take into consideration all sources of light. These, when simplified for general use, will be of considerable value in laying out a more glare-free educational environment.

Electrical Facilities

There has appeared in the literature some difference of opinion regarding central sound systems. Perkins and Cocking (55) stated that equal results at less cost could be achieved with room radios rather than a central system. Other authors continued to assume the merits of central systems and described how to make them more effective. Bildersee (15) described the characteristics of good public address equipment and the conditions necessary for proper installation. The *Architectural Record* (7) published plans to implement the recommendations of the United States Office of Education and the Radio Manufacturers of America. Cumming (22) also made detailed suggestions for installation. Sullivan (68) predicted the early development of public address systems that would obviate the need for special wiring in the building. Louis (47) discussed several ways of using a public address system, while Pratt (57) described the use of such equipment in the administration of group tests.

Lewis (44) advocated television conduit in new construction and forecast the development of television systems similar to central public address equipment.

Detzer (25) described the use, in at least eight states, of telephone facilities to enable bed-ridden pupils at home to hear and participate in discussion in their classrooms, and one article (6) discussed a telephone-television combination to serve the same purpose.

Plumbing and Sanitary Facilities

Brown (18) made a detailed comparison of the plumbing and sanitary requirements of the several states with the recommendations of the National Council on Schoolhouse Construction and found little agreement.

There was general agreement in the literature that toilet rooms must be brought out of basements and placed in more convenient and pleasant locations. Several authors discussed proper heights of plumbing fixtures (8, 26, 72). New York State, for example, recommended facilities for each sex on each floor (72). While New York State advocated baby-size water closets for kindergarten and primary grades, Perkins and Cocking (55) maintained that they were too small for comfort and not worth buying. The health implications were not discussed.

Perkins and Cocking (55) saw a trend toward drinking fountains in each classroom. Irmiter (37) and Campbell (21) discussed ways of controlling variations in flow of drinking fountains.

Viles (75) deplored the level of sanitation commonly found in school buildings. A committee of the American Public Health Association was reported (4) to be working on a grading system to rate the status of school sanitation, but apparently had made no substantial progress. Sturkie (67) reported an evaluation of sanitary conditions in the school buildings of Lynchburg, Virginia, and indicated a prevalence of sanitary defects in terms of the somewhat outmoded standards used.

Heating and Ventilating

Kump (41) discussed the principles of radiant heating and their application to school buildings. He stated that few pipe failures had occurred in installations now 10 to 15 years old. Low operating costs and comfort were among the advantages cited. Hosford (35) and Bursch (19) also reported favorably on this type of heating, and the latter reported a definite trend toward panel heating in California.

Lewis (45) discussed his experience as an engineer in converting old, hot air furnaces by installing steam or hot water convectors to heat the air. He also advocated hot air in new buildings, even if one-story construction.

Radder (60) discussed ways of keeping down heating costs by proper use and care of equipment, and Barbour (9) gave practical suggestions on boiler room safety.

Viles (73) presented a generalized discussion of heating and ventilating for classroom teachers.

Buttolph (20) discussed the use of ultraviolet lamps in school buildings with particular attention to installation in ducts. He also pointed out the need for proper painting to avoid objectionable reflectance for classroom ceilings. Hodges (33) reviewed favorably test data on the use of germicidal lamps in schoolrooms. The Council on Physical Medicine of the American Medical Association (5) continued to refrain from endorsing ultraviolet lamps for classroom use, but stated that such use was on the border line of acceptable applications. Seagers (62), while indicating that the use of such devices was still experimental, did indicate some beneficial results if used with proper precautions. He indicated that the use of aerosols was likewise still in the experimental stage.

Bibliography

1. ALLPHIN, WILLARD. "Brightness Engineering Calculations for School and Office Lighting." *Illuminating Engineering* 42: 741-57; September 1947.
2. ALLPHIN, WILLARD. "School Lighting Tests." *American School Board Journal* 117: 33-34; August 1948.
3. ALMACK, JOHN C. "Better Lighting for Better Seeing." *American School Board Journal* 120: 37-38; May 1950.
4. AMERICAN JOURNAL OF PUBLIC HEALTH. "School Sanitation; A Report of the Committee on School Sanitation." *American Journal of Public Health* 39 sup. 111-13; May 1949.

5. American Medical Association, Council on Physical Medicine. "Acceptance of Ultraviolet Lamps for Disinfecting Purposes." *Journal of American Medical Association* 137: 1600-1603; August 28, 1948.
6. American Teacher. "Television and Telephone Can Be Combined To Bring the Classroom to the Shut-In Child." *American Teacher* 34: 14; April 1950.
7. Architectural Record. "Planning for Central Sound Systems." *Architectural Record* 101: 90-92; January 1947.
8. Architectural Record. "Pupils' Working Heights; Data on Special Toilets; Safe Stairs; Time Saver Standards." *Architectural Record* 103: 153; March 1948.
9. Barbour, Julius. "Boiler Room Safety." *Nation's Schools* 42: 60-62; August 1948.
10. Beckwith, Herbert L.; Peterson, Carl M. F.; and Moon, Parry. "Glare-Free Lighting Methods Studies by M. I. T." *Architectural Record* 105: 145-57; June 1949.
11. Benford, Frank. "Duration and Intensity of Sunshine." *Illuminating Engineering* 42: 527-54, May 1947; 877-89, November 1947; 43: 533-46, May 1948; 699-610, July 1948; 44: 389-97, July 1949.
12. Benson, Benjamin S., Jr. "Louverall Lighting Techniques." *Illuminating Engineering* 44: 89-98; February 1949.
13. Benson, Benjamin S., Jr., and Church, Eric H. "The Effects of Luminous Ceiling Elements on Visibility." *Illuminating Engineering* 44: 715-22; December 1949.
14. Biesele, Rudolph L., Jr. "Daylight in Classrooms." *American School Board Journal* 120: 35-37; January 1950.
15. Bildersee, Max U. "Planning the School Sound System." *The American School and University*. Eighteenth Annual Edition. New York: American School Publishing Corporation, 1946. p. 215-18.
16. Bitterman, Morton E. "Lighting and Visual Efficiency: The Present Status of Research." *Illuminating Engineering* 43: 906-22; September 1948.
17. Birren, Faber. "On Understanding Color." *Illuminating Engineering* 43: 711-16; July 1948.
18. Brown, Milton Wright. *Standards for School Plant Construction Established by State Requirements.* Doctor's thesis. Chicago: University of Chicago, 1946. 168 p.
19. Bursch, Charles W. "It's Good—But Expensive." *Nation's Schools* 40: 36-38; December 1947.
20. Buttolph, L. J. "Ultraviolet Air Sanitation in Schools." *Bulletin of the School of Education, Indiana University* 25: 56-65; September 1949.
21. Campbell, Roald F., and Marshall, John E., editors. *Developing School Plant Programs.* Salt Lake City: University of Utah, Department of Elementary Education, 1949. 76 p.
22. Cumming, William K., Jr. "Centralized Sound Systems for Schools." *American School Board Journal* 118: 76; June 1949.
23. Darley, William G. "Odyssey Toward Quality." *American School Board Journal* 115: 21-23; December 1947.
24. Darley, William G. "An Analysis of Reflected Glare." *Illuminating Engineering* 43: 85-103; January 1948.
25. Detzer, Karl W. "Wired for School." *Parents' Magazine* 25: 42; May 1945.
26. Engelhardt, Nickolaus L.; Engelhardt, Nickolaus L., Jr.; and Leggett, Stanton. "*Planning Secondary School Buildings.*" New York: Reinhold Publishing Corporation, 1949. 252 p.
27. Essex, Don L. "Lighting for School Buildings." *The American School and University*. Twentieth Annual Edition. New York: American School Publishing Corporation, 1948. p. 124-30.
28. Fallon, Patrick T., and Allphin, Willard. "Model Classroom, One Year Later." *School Executive* 66: 33-35; January 1947.
29. Folsom, William E., and Biesele, Rudolph L., Jr. "Measurement of Illumination and Brightness in a Classroom." *Illuminating Engineering* 43: 355-70; April 1948.
30. Gibson, Charles D. "Daylight Is Bright Enough Everywhere if We Are." *Architectural Record* 103: 125-30; March 1948.

31. GIBSON, CHARLES D. "Be Your Own Lighting Expert." *National Education Association Journal* 39: 254-55; April 1950.
32. HARRISON, WARD, and MEAKER, PHELPE. "Further Data on Glare Fatigue." *Illuminating Engineering* 42: 153-79; February 1947.
33. HODGES, JAMES A. "Perpetual Spring in the Classroom." *School Executive* 66: 42-43; February 1947.
34. HOFFMAN, ARTHUR C. "Luckiesh and Moss on Reading Illumination." *Journal of Applied Psychology* 31: 44-53; February 1947.
35. HOSFORD, J. C. "For Health and Comfort." *Nation's Schools* 40: 34-35; December 1947.
36. ILLUMINATING ENGINEERING SOCIETY, AMERICAN INSTITUTE OF ARCHITECTS. "The American Standard Practice for School Lighting." *Illuminating Engineering* 43: 796-865; September 1948.
37. IRMITER, RICHARD. "Care and Cleaning of Plumbing Fixtures in School Buildings." *American School Board Journal* 119: 45-47; July 1949.
38. JOHNSON, WILLIAM A., and OTHERS. "Transverse Framing Makes Top Daylight Economical." *Architectural Record* 105: 126-27; March 1949.
39. KAHLER, WILLIAM A., and MEACHAM, JAMES A. "Correlation of Brightness Ratios and Decoration." *Illuminating Engineering* 43: 175-91; February 1948.
40. KUMP, ERNEST J. "Development of a Natural Daylighting System for Modern School Buildings." *American School Board Journal* 116: 35-38; June 1948.
41. KUMP, ERNEST J. "Radiant Heating for School Buildings." *The American School and University.* Nineteenth Annual Edition. New York: American School Publishing Corporation, 1947. p. 100-105.
42. KUNTZ, JAMES E., and SLEIGHT, ROBERT B. "Effect of Target Brightness on 'Normal' and 'Subnormal' Visual Acuity." *Journal of Applied Psychology* 33: 83-91; February 1949.
43. LEWIS, JOHN W. "Cold Cathode Fluorescent Lighting." *American School Board Journal* 118: 29-30; January 1949.
44. LEWIS, PHILLIP. "Television Goes to School." *Educational Screen* 27: 431-39; November 1948.
45. LEWIS, SAMUEL R. "New Phases of Heating and Ventilation." *Bulletin of the School of Education, Indiana University* 24: 65-68; September 1948.
46. LOGAN, HARRY L. "Light for Living." *Illuminating Engineering* 42: 291-319; March 1947.
47. LOUIS, WOLCOTT B. "Aids in Managing a Public Address System." *School Management* 17: 48; October 1947.
48. LUCKIESH, MATTHEW. "Footcandle Levels, Threshold, Ideal, Optimum and Recommended." *Illuminating Engineering* 43: 395-411; April 1948.
49. LUCKIESH, MATTHEW. "Important Concepts Underlying Lighting for Critical Seeing." *Illuminating Engineering* 44: 226-30; April 1949.
50. LUCKIESH, MATTHEW, and GUTH, SYLVESTER K. "Brightnesses in Visual Field at Borderline Between Comfort and Discomfort (BCD)." *Illuminating Engineering* 44: 650-70; November 1949.
51. MOON, PARRY. "The New Approach to Room Lighting." *Illuminating Engineering* 44: 221-25; April 1949.
52. MOON, PARRY, and SPENCER, DOMINA EBERLE. "Luminous Ceiling Lighting." *Illuminating Engineering* 44: 465-72; August 1949.
53. NICKERSON, DOROTHY. "A Simple Method for Judging Reflectance." *Illuminating Engineering* 44: 151-53; March 1949.
54. PEARSON, HENRY. "Edge Lighting of Acrylic Plastics." *Architectural Forum* 86: 106-12; January 1947.
55. PERKINS, LAWRENCE B., and COCKING, WALTER D. *Schools.* New York: Reinhold Publishing Corporation, 1949. 264 p.
56. POTTER, WENTWORTH M., and OETTING, ROBERT L. "Design and Illumination Characteristics of Louver and Louverall Systems." *Illuminating Engineering* 44: 16-27, January; 341-53, June 1949.
57. PRATT, HARRY H. "Mass Tests Via the Public-Address System at Pompton Lakes." *Clearing House* 22: 206-207; December 1947.
58. PUTNAM, RUSSELL C. "Modern Trends in School Lighting." *Nation's Schools* 39: 44-47; May 1947.

59. PUTNAM, RUSSELL C. "The American Standard Practice for School Lighting—Its Preparation, Use, and Value." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 284-87.
60. RADDER, NORMAN J. "Heating Costs Can Be Kept Down." *Nation's Schools* 40: 62-64; September 1947.
61. SCHMIDT, HANS W. "Better Classroom Daylighting: An Engineering Study." *American School Board Journal* 119: 45-46; December 1949.
62. SEAGERS, PAUL W. "A Different Approach to Ventilation." *Nation's Schools* 42: 60-64; October 1948.
63. SEAGERS, PAUL W. "Visual Environment for Schoolrooms." *Bulletin of the School of Education, Indiana University* 26: 5-24; May 1950.
64. SHARP, HOWARD M. "A Critical Analysis of American Standard Practice for School Lighting." *American School Board Journal* 118: 33-34; January 1949.
65. SPENCER, DOMINA EBERLE. "Classroom Lighting." *Illuminating Engineering* 43: 734-53; July 1948.
66. SPENCER, DOMINA EBERLE. "A Luminous Environment for Classrooms." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 297-301.
67. STURKIE, SAMUEL D. "Increasing the Scope of School Sanitation Service in Local Department of Health Programs." *American Journal of Public Health* 38: 997-1002; July 1948.
68. SULLIVAN, BERNARD J. "Modern Sound Systems for Modern Schools." *American School Board Journal* 115: 34; December 1947.
69. TINKER, MILES A. "Illumination Standards for Effective and Easy Seeing." *Psychological Bulletin* 44: 435-50; September 1947.
70. TINKER, MILES A. "Cumulative Effect of Marginal Conditions Upon Rate of Perception in Reading." *Journal of Applied Psychology* 32: 537-40; October 1948.
71. TURNER, ALLEN S., and BRAINERD, ARTHUR A. "Classroom Fields of Vision." *Illuminating Engineering* 42: 488-98; April 1947.
72. UNIVERSITY OF THE STATE OF NEW YORK, THE STATE EDUCATION DEPARTMENT, DIVISION OF SCHOOL BUILDINGS AND GROUNDS. *Sanitary Facilities in School Buildings.* Albany: University of the State of New York, 1947. 8 p.
73. VILES, NELSON E. "Classroom Heating and Ventilating." *Journal of the National Education Association* 39: 20-21; January 1950.
74. VILES, NELSON E. "The Effect of Directional Glass Blocks on Daytime Lighting in Classrooms." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 293-96.
75. VILES, NELSON E. "Sanitation in Many School Buildings Deplorable." *School Life* 32: 113-14; May 1950.
76. WALTERS, WILLIAM T. "Schools Can Be Lighted Economically." *American School Board Journal* 120: 35-37; February 1950.
77. WEST, EUGENE S. "The Characteristics of Cold Cathode Fluorescent Lamps." *Illuminating Engineering* 44: 487-92; August 1949.
78. WINKLER, FREDERIC C., and NEIDHART, JOHN J. "Application of Recommended Brightness Limitations to School Classrooms." *Illuminating Engineering* 44: 529-30; September 1949.

CHAPTER VI

Financing School-Plant Developments

DAN H. COOPER*

THE several excellent studies of school-plant finance which have been published in the past three years provide much valuable information for the use of school administrators, members of boards of education, architects, school patrons, and taxpayers in meeting their school development problems. The available studies not only have demonstrated the practical value of research in school-plant finance; they also have served to open the field in an exploratory fashion. Much good would surely be derived if expanded research resources could be made available for school-plant finance studies in state departments of education, in the U. S. Office of Education, in universities, and in research bureaus elsewhere. The problems of school-building finance are not the only educational problems for which an expanded program of research is needed; but the tremendous amount of money necessary currently for school-building construction has created a situation which urgently needs thoro and detailed research analysis.

The literature on school-plant financing published during the period covered by this chapter may be classified under the following headings: (a) expenditures for school-plant developments, (b) predictions of future expenditures, (c) predictions of future financial resources, (d) state and federal contributions to school-plant financing, (e) unit costs and cost indexes for school-plant developments, (f) methods of economizing on the cost of school-plant developments, and (g) nonconstruction costs in school-plant developments.

Expenditures for School-Plant Developments

The magnitude of the expenditures which have gone into new school buildings and sites in recent years may be appreciated from figures which Cocking (10) collected from 2370 school systems and from colleges and universities. Sixty-one percent of the school districts reporting to Cocking had constructed new school buildings since World War II or were planning to build in 1949. During 1949, 3316 public school buildings were constructed, at a cost exceeding $1.038 billion. During the same year, contracts were awarded for 879 college and university buildings, at a total cost of over $352 million; and these figures did not include colleges with enrolments of less than 1000 students. The total expenditure in 1949 for public elementary- and secondary-school plant developments, and for college and university buildings, was estimated on the basis of the evidence at $1.4 billion.

---

* The author is indebted to N. LeRoy Nelson, research assistant, State University of Iowa, for assistance in gathering references.

Cocking's research provided information not only on the nation as a whole, but also for the major regions within the United States. Interestingly, the expenditures for public elementary- and secondary-school buildings did not always parallel the volume of building in terms of numbers of new schools from region to region. From 1945 thru 1949, the school districts reporting from New England constructed 7 percent of the total number of buildings at 6 percent of the total national expenditure; the Middle Atlantic school systems reported 19 percent of the total number of buildings which accounted for 36 percent of the total national cost; the school districts reporting from the South were responsible for about 26 percent of the total number of buildings and for about 19 percent of the total expenditures; the Midwest school districts built about 26 percent of the nation's new schools for about 23 percent of the nation's total expenditure; and the reporting school districts of the West built 22 percent of the nation's new schools for 16 percent of the nation's total expenditure. The Middle Atlantic school systems seem to have paid a much larger proportion of cost for the number of schools erected; while the school districts of the South and West have obtained proportionately more school buildings for their share of the national expenditure.

Estimates of the expenditures needed for new school-plant developments in the nation, while always staggering to the imagination, have been increased in the more recent investigations. Linn (33) estimated the cost of necessary school buildings at $5 billion for the decade 1948-57, based on a probable increase of 5 million pupils in elementary and secondary schools, and assuming a capital investment of $1000 per added pupil. The interest alone on this expenditure, assuming amortization over 20 years with interest at the rate of 2¾ percent, was calculated at $1.375 billion. The *Nation's Schools* (43) in February 1948, reported an estimate by the U. S. Office of Education of $6.6 billion for immediately needed new public elementary- and secondary-school buildings, with an additional $800 million necessary for nonpublic schools, $3.5 million for colleges and universities, and $2 billion to accommodate anticipated enrolment increases. The 1948 yearbook committee of the American Association of School Administrators (2) raised previous estimates of expenditures for capital outlay to $1.25 billion annually, or apparently to a total of $12.5 billion over a 10-year period. In October 1949, Hamon (25) published an estimate of $10 billion as the necessary expenditure of the forthcoming decade for new public elementary- and secondary-school buildings. Morphet (36) estimated in 1949 that $11.25 billion (sic, $11.125 billion) would be needed within the decade, exclusive of interest and other necessary charges for bonds. Morphet's figures are similar to the statistics compiled by Chase and Morphet (12) from questionnaires returned from the 48 state departments of education regarding school-building needs. In both of these studies to which Morphet contributed, attention has been called to the necessity of adding to actual building cost figures from $2 billion to $2.25 billion for interest and other charges in connection with bond issues.

On the basis of revised school enrolment forecasts and more recent figures on construction costs, Hamon (24) calculated an estimate of $13.5 billion for public elementary- and secondary-school buildings for the 10-year period beginning in 1950. Provision was made in this estimate for anticipated enrolment increases, for the replacement of obsolete and unsafe buildings and classrooms, for district reorganization, for extensions of education to include more kindergarten and junior college classes, and for supplementary spaces such as libraries and lunchrooms. *School Management* (48) published an estimate similar to this figure.

After adding an estimated $1.5 billion for nonpublic elementary- and secondary-school buildings to the initial sum, and an estimated $5 billion for college and university buildings, Hamon reached a grand total of $20 billion needed for the construction of educational buildings in the next decade. Translated into labor, this estimated financial need was calculated as representing the labor of 5 million man-years to produce completed buildings from raw material.

An allocation of the equivalent of 500,000 men annually for the next 10 years to school-building construction in this nation should be a problem of more than academic interest to manpower specialists of the nation. The international tension, which has deepened since these estimates of need were made, is as likely to increase the school-building need as to relieve it, particularly at elementary- and secondary-school levels. Significantly, Hamon (24) indicated that his estimates of financial and manpower needs are probably still too conservative.

In addition to these studies of the amount of money needed thruout the nation for school buildings, there have been studies smaller in scope. Many survey reports have included estimates of the cost of school-plant developments needed for individual local school districts, as well as for state school systems, systems of higher education, and nonpublic school systems. This survey literature has not been included in this review of research on school-plant finance. An example of an estimate of needed school-building construction for a single state is that by Clapp (7), indicating that $400 million would be required "for the cost of placing Michigan's total school plant in reasonably good condition in the next few years."

The cost of meeting the school-housing needs of city school systems in 1947-48 has been estimated by the Research Division of the National Education Association (42), on the basis of reports from 1600 superintendents of schools. An outlay of about $1.5 billion was found immediately necessary to relieve overcrowding in classrooms, to eliminate half-day sessions, and to replace substandard facilities.

All of the estimates of future expenditures for school plants are subject to some margin of error; and certainly the future may bring some surprises to upset predictions. An important feature in these predictions, however, is that they are based in large measure on factors which are relatively definite. Evidence is at hand that half-day sessions are in operation, that class sizes exceed recognized standards, that substandard classrooms are in use, and that incoming kindergarten and first-grade groups of children will be larger for the next few years. Some of the factors which will influence school-plant expenditures may be modifiable; but other factors which form the basis of prediction are already established. Consequently, there is an element of inevitability about the forecasts of present and future building needs which should serve to encourage serious efforts to cope with their predictions.

Predictions of Future Financial Resources

An effective antidote to public reaction resulting from predictions of needed future expenditures would seem to be accurate predictions of future financial resources for necessary plant developments. Fortunately, several encouraging reports, indicating that this nation can easily afford to meet its building needs, have been made. The 1948 yearbook of the American Association of School Administrators (2) reviewed evidence regarding the probable national income during the next decade, to show that the nation can afford capital outlay and other expanded expenditures for education without exceeding the percentage of the national income which was devoted to education in the 1930's; and without equaling the percentage of the national income devoted to education by some foreign countries. In harmony with other pronouncements of the American Association of School Administrators, this yearbook reminded its readers that expenditures for good schools do not in any case constitute a drain on national income, but that these expenditures are investments which result in ever higher standards of living. By this view this nation may continue to progress toward ever higher economic levels only by ever more liberal expenditures for all phases of education.

During and just prior to the period covered in this review, economists have been making exhaustive studies of the nation's ability to support progress. Each of these reports presented dramatic and abundant evidence of the potential capacity of our nation to produce all the wealth needed for good schools and for a multitude of other desirable things.

A study by Dewhurst and others (15) under the sponsorship of the Twentieth Century Fund, summarized for popular distribution by Carskadon and Modley (5), examined the nation's productive capacity from 1850 to 1947 and projected the observed trends forward to 1950 and to 1960. Provided that the nation would have neither war nor serious depression, the national income at 1947 prices likely to be achieved in 1950 was found to be $165.4 billion—an increase of about $45 billion since 1940 or of $75 billion since 1930. By 1960 the probable national income at 1947 prices was found to be $190.3 billion—another increase of about $25 billion within a decade. Even if war should come, the nation was found capable of exceeding peak World War II production levels by 50 percent.

These forecasts of national productivity were predicated on rather conservative assumptions, with the result that the estimates for national income in 1960 were actually exceeded in 1950. The actual 1950 national income according to computations made from data in the U. S. Department of Commerce *Survey of Current Business* (51) is roughly $220 billion in 1947 values, in contrast to the $90 billion income of 1930 or the $121 billion income of 1940. Even without the stimulus of the Korean War during the last half of 1950, the 1950 national income in 1947 dollars would undoubtedly have exceeded $200 billion. This means that the nation has more available resources than ever before to finance such developments as new school buildings; and that progressively the nation becomes ever more capable of meeting its needs.

Moulton (38), in a report for The Brookings Institution, posed the question: So far as natural resources and productive capacity are concerned, might the United States a century hence support a population double that of the present on a plane of living eight times as high as that now prevailing? The answer, at the conclusion of a chapter devoted to analysis of future economic prospects, is:

". . . There can be little doubt that the onward sweep of science and technology as a whole is such that in one way or another scientific advancement as applied to the processes of production could yield results of the magnitude projected at the beginning of this chapter" (p. 246).

The results projected by Moulton for education within the century are even more startling than his general prediction of a plane of living eight times as high as that now prevailing. His reasoning and his findings are expressed in the following quotation:

"The allocation of expenditures changes materially as income rises. Budgetary studies reveal that the great bulk of expenditures in the lower income ranges goes for food, housing, and clothing. Thru the middle- and higher-income brackets, the percentage spent for the basic necessities of life falls, while the proportion going for so-called conventional necessities and luxuries rises. . . .

"Thus on the basis of actual experience, it is possible to indicate roughly what the volume of expenditures for major classes of goods and services would be if the population were doubled and the plane of living were eight times as high. . . . Under these conditions expenditures in the various categories would be multiplied as follows:

Food and nutrition—about eight times
Shelter and home maintenance—about sixteen times
Attire and personal care—about twenty times
Health and education—about thirty times
Recreation and travel—about thirty-three times" (p. 204-205).

Clark (9), in commenting on the Moulton study, computed the annual expenditure for school plant under a thirty-fold (sic., thirty-three-fold) increase at $17 billion a year, in contrast to the record-breaking $1.4 billion actual expenditure of 1949 as reported by Cocking.

The accumulated evidence of the past triennium regarding future financial resources in the nation is abundant and exciting. The productive capacities of which the nation is capable seem even more fantastic than the school plant and other needs which should be met. After studying the evidence for a time, both of needs and of resources, the reader is likely to feel that the only thing which may prove small and limiting in the future is one's own vision and courage.

State and Federal Contributions to School-Plant Finance

It is one thing to show that the nation has progressively larger resources with which to build schools; but it is something else to find ways of obtaining for schools the necessary portion of the national income. Clark (9), after discussing the economic prospects outlined by Moulton, expressed the prevailing and often repeated view of educators and others on this matter when he wrote:

"We have probably passed the safe limit of local taxation. Greatly expanded expenditures for education will depend then upon revenue collected by the state or national governments" (p. 62).

Many viewpoints and several research studies along this line have been reported. *School Management* (48) outlined principles which are believed to be sound for any program of federal aid for school-building construction. Arguments in behalf of federal and state aid for school-building construction have been presented by Eckles (16); Hamon (24); Hewes (28); McLure (34, 35); Morphet (36); Perkins and Cocking (44); and Thurston (52).

Lee (32) contributed a doctoral study of the early history of federal aid to education. He recounted the late eighteenth and early nineteenth century grants of land and other resources from the federal government, which aided many communities in building their first schoolhouse; and he reported the controversies of the 1870's regarding the Hoar Bill which included, as part of a national system of education, provisions for federal construction of school buildings. Hewes (28) chronicled the school-building achievements of the federal government by means of the PWA, the WPA, and the Federal Works Agency Advance Planning and Lanham Act programs, wherein many thousands of new school buildings and additions to school buildings were constructed between 1933 and 1948. Hewes (27) also reported the desperate situations of some 395 school districts serving areas where federal governmental activities have attracted many families with children, but where the government holds much of the property, including frequently the residences of the families, without being obligated to pay local school taxes. These situations should be relieved by recent federal legislation described by Hamon (23) to provide funds for (a) grants to states for school-building surveys and (b) grants to school districts overburdened with enrolments resulting from war, defense, and federal activities. A wealth of data and illustrations on the need for more schoolhousing in localities and in the nation, and on the merits of the bills before the Eighty-First Congress to provide federal assistance for the construction of school buildings, appeared in the published hearings (11) on the bills.

Individual programs of state aid for school-building planning and construction have been described by Bursch (3); Cocking (10); Dawson (14); Simpson (50); Morphet, Reller, and Bursch (37); *School Life* (47); the National Commission on School District Reorganization (39); and the 1949 Yearbook Commission of the American Association of School Administrators (1). Three comprehensive surveys of state programs of financial aid for school-building construction were compiled by Chase and Morphet (12) from their questionnaire study of the 48 state departments of education for the Council of State Governments; by Hamon (25) in an article describing the programs of aid in 19 states now providing some financial assistance to local school districts for capital outlay; and by Jarvis (30) in his doctoral dissertation, *Methods of Financing School-Building Construction in the Forty-Eight States.*

Jarvis (29) also submitted 60 features of federal-state-local plans for school-plant financing to specialists for appraisal. On the basis of the replies he described an ideal plan of school-building finance. He found that the states ranged from 65 percent to 21 percent of perfection in their methods of school-building finance when rated against the ideal.

Morphet, Reller, and Bursch (37) have prepared a report of a regional conference held at the University of California on the financing of school-plant developments. Six work committees at the three-day meeting considered various aspects of state participation in school-building financing. This report has merit as an account of the pooled wisdom and thinking of experienced school-building specialists from several states.

Several general conclusions can be drawn from the literature on state and federal contributions to school-plant finance: (a) there has been an unusual concentration of attention on the subject; (b) in all the volume of writing on the subject, including the report of extensive hearings of federal aid for school-building construction before a subcommittee of the United States Senate, there has not been a single dissenting voice against state and federal aid for capital outlay for schools; (c) the principles of procedure set forth in the literature for state and federal-aid plans seem to be widely accepted and understood; and (d) in spite of the seemingly unanimous approval of state and federal aid, progress seems dishearteningly slow, even tho some beginnings have been made.

In view of these conclusions, the task ahead seems clear. Here, in the achievement of state and federal school-plant aid, is a project endorsed by virtually all educators and many other persons, and enjoying a high priority of urgency and importance. Upon this project the most careful and intensive of investigations, and a wide dissemination of factual evidence and viewpoint, seems warranted. Much of the evidence still needed, especially from states where school-plant data have not yet been systematically procured, may come from official governmental studies; but additional investigations and a wider appreciation of the significance of the evidence can be supplied by many contributors.

Unit Costs and Cost Indexes

Estimates of the anticipated costs of building, comparisons of the costs of buildings, trends in building costs, and methods of economizing in costs may be discussed in terms of some unit of cost. The unit may be the classroom, the classroom equivalent, the pupil, the "weighted pupil," the cubic foot, or the square foot of floor area. Trends in these unit costs may be reported in the form of index figures. Most new school buildings of consequence are described in the professional literature upon completion, and in the more helpful descriptions some type of unit cost data are provided.

One of the most helpful and frequently quoted studies of costs is a cost index figure published every two months in *School Executive* by Clark (8). Based on 1939 costs, the April 1950 index stood at 181.8 with further rises anticipated. Eckles (16) and Exton (21) provided tables prepared by N. E. Viles of the U. S. Office of Education showing an index of school-building costs ranging from 100 in 1913 to 480.2 in October 1948. Perkins and Cocking (44) reported on over-all construction costs from the January 1947 *Dunn's Review*, showing a rise from an index of 100 in 1914 until the comparable contemporary figure had exceeded 300. The *Research Bulletin* of the National Education Association (41) reported an index prepared by Boeckh and others, indicating the rise in construction costs since 1928. In all of these reports, the spectacular rise in building costs is apparent.

Eleven reports have been found which present unit cost figures for recent school-building construction. Engelhardt (20), and Perkins and Cocking (44), summarized cost per cubic foot for typical construction. The Research Division of the NEA (41) collected data on cost per cubic foot for 126 buildings completed, or for which contracts were let in 1947. Later, the Educational Research Service (42) reported cost per cubic foot for 69 school buildings completed during the period 1947-50. This publication also supplied data on the cost of purchase and preparation of site for 63 projects. Carlson (4) reported average cost per cubic foot for 29 buildings; and *School Business Affairs* (45) gave both cost per cubic foot and cost per square foot data for each of 11 buildings. Chase and Morphet (12) reported estimates of cost per cubic foot, cost per square foot, or cost per classroom unit from 31 of the state departments of education. Most of these estimates were reportedly based on systematic studies within the respective states.

School Business Affairs (46) has also reported per pupil cost figures for a group of 29 elementary-school, six junior high-school, seven high-school, and three college buildings surveyed in the *Engineering News-*

Record. The original study in *Engineering News-Record* (18) gave per pupil, per cubic foot, and per square foot costs. Information on the cost per pupil and per "weighted pupil unit" for 23 school-building projects was supplied by McLure (35).

The impressive feature of these unit cost reports is the wide variation in cost from project to project. Costs per cubic foot ranged during the period of these reports from 32 cents to $2.50 (42). Costs per pupil were reported ranging from $193 to $2044 (45). Even allowing for variations in reporting practices, these differences raise many questions. The Research Division of the NEA noted some variations in cost by regions; and the Educational Research Service classified its information by type of construction to show variations of cost in this respect. Clearly, as *Engineering News-Record* (19) pointed out, variation in educational adequacy is another reason for variation in building cost, especially when building cost is expressed in an amount per classroom or per pupil. Nevertheless, one of the deficiencies in school-plant finance research appears to be in the supply of detailed comparative studies of the reasons for differences in unit costs of construction.

A useful study of details in school-building costs has been provided by Harriman (26) in two issues of *Architectural Record.* Working from the contractors' cost sheets for recently completed buildings, the author presented cost per square foot of floor space and cost per classroom unit for (a) three types of exterior walls (glass blocks above steel frame sash, double glazing in wood sash, and single glazing in wood sash), (b) five types of roof structures, (c) three types of gymnasium roof, (d) three ceiling heights and three classroom widths, (e) one- and two-story building types, and (f) buildings with single- and double-loaded corridors. The most economical construction proved to consist of single-glazed wood sash walls, of nonfireproof pitched roof, of laminated timber oval roof arches in gymnasiums, and of one-story buildings with double-loaded corridors. An increase in span was found to yield a *decrease* in square foot cost in classrooms with ceiling height held constant. Harriman (26) concluded that the most economical type of building would be a one-story structure with double-loaded corridor, with a pitched roof of minimum height at the eaves, and with clerestory lighting above the corridor. (The latter, presumably, to permit wider and shorter classrooms.) Coming from an architect whose firm has designed schools over a period of 69 years in the cold-winter state of Maine, these conclusions are noteworthy.

Methods of Economizing on Construction Cost

The Harriman (26) study presented not only a penetrating analysis of factors affecting unit costs but also economy in cost. More studies like it should be made available to school administrators and others. Less objective, but quite suggestive, is a tabulation prepared by Christensen of the architectural firm, Kump and Falk, and published in the

Engineering News-Record (18). The table classifies materials for 35 features of a building under the headings (a) lowest cost, (b) medium cost, and (c) highest cost. For roofing, the low cost materials are roll roofing and asphalt shingles; the medium cost materials, split shakes and asbestos shingles; the highest cost, tile and slate. The article points out that economy is affected by quality, by completeness of initial development, by site development, and by the extent and complexity of utilities and services for a building.

A thought-provoking discussion of possible economies in construction and design was presented in the Twenty-Seventh Yearbook of the American Association of School Administrators (1). In contrast with the evidence presented by Harriman, the yearbook stated that large multi-story buildings of fire-resistive construction thruout will be more economical than one-story structures, if the same standards of construction are applied to the one-story structure. Many persons would be interested in a resolution of the conflicting positions on this point. Possibly the fallacy in the yearbook statement is in its implication that the same standards of construction should be applied to one-story structures as to multi-storied structures.

A protagonist on the side of the one-story building was Johnson (31). He argued the merits of a host of methods for achieving economy. Factual data of interest was presented on one point—the relative cost of several kinds of building material. Concrete block proved to be the most economical, at $9.50 per square foot of building for schools in the state of Washington. Other materials were listed as follows: frame and stucco, $10.57; brick, $11.57; brick over concrete, $12.50; frame, $12.50; brick over tile, $13.50; brick veneer over frame, $14.50; and solid concrete, $16.50. If these figures are typical, they should influence practice greatly.

Van Nuys (53) argued persuasively for contemporary design as a means of achieving economy. Defined as the architectural result of over-all planning in terms of the kinds of space needed for activities within a school, contemporary design was described as (a) avoiding the waste of superficial massive decorative effects; (b) eliminating the useless spaces resulting from a predetermined external form; and (c) reducing the inflexibility which, according to Van Nuys, often leads eventually to nonfunctional, yet expensive structures.

Nonconstruction Costs in School-Plant Developments

The financing of a school-plant project involves many items in addition to the construction costs. The yearbook of the American Association of School Administrators (1) on school buildings presented evidence to show that construction costs for nine typical developments were from 74.1 percent to 89.6 percent of the total initial costs. The remaining 10 to 26 percent of initial costs were used for legal advice, site development, architects' and engineers' fees, furniture and equipment, and miscellaneous.

In addition to these extra initial costs, interest on bonds and incidental expenses in connection with bonding may require large amounts of money. The AASA Yearbook (1) devoted the major portion of one of its chapters to principles and problems of bonding, giving particular attention to types of bonds, legal regulations applicable to school bonds, the establishment of a credit rating, the bond attorney, procedures in the sale of bonds, and the safeguarding of funds. Castetter (6) provided further advice on the principles and problems of bonding, describing many details of procedure and referring readers to a bibliography for more instructions.

Chase and Morphet (12) secured information from each of the 48 state departments of education on provisions in the various states relating to school-bond issues. Their table and summary of bonding limitations, voting requirements, approval regulations, and authorized purposes is a valuable source of information. For city school systems, information on provisions with respect to school-bond issues has been supplied by the NEA Research Division (40). Reporting data from 1892 school systems, the *Research Bulletin* describes the authority of the school boards to levy and collect taxes, and to issue bonds.

Since a critical element in most bond issues is the public campaign and vote by which the bond issue is authorized, several articles dealt with the public relations involved in bond campaigns. Typical of this literature was the study of Ohio bond campaigns by the Ohio State Education Association (49); and an article by Crosby (13). Both of these reports listed features which seem to contribute to successful bond campaigns.

Clark (8), in his regular feature article published every two months in the *School Executive*, provides valuable information on trends and current interest rates on school bonds. One of the bright spots in the picture of rising costs is the information from Clark showing current interest rates at an average of 1.93 percent in April 1950. This is a lower rate of interest than has been available to borrowers at any previous time.

Bibliography

1. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *American School Buildings.* Twenty-Seventh Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. Chapter 12, "Economies in Construction and Design," p. 201-16; Chapter 17, "Financing the Plant Construction Program," p. 288-308.
2. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *The Expanding Role of Education.* Twenty-Sixth Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. Chapter 12, "Adequate Financial Support," p. 263-84.
3. BURSCH, CHARLES. "California Votes $250,000,000 State Aid." *Nation's Schools* 45: 32; January 1950.
4. CARLSON, FRANCIS G. "New School Construction Data." *School Business Affairs* 15: 6; September 1949.
5. CARSKADON, THOMAS R., and MODLEY, RUDOLPH. *U. S. A. Measure of a Nation.* New York: The Macmillan Company, 1949. 101 p.

6. Castetter, William B. "Suggestions for Planning School Bond Issues." *The American School and University*. Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 59-65.
7. Clapp, Wilfred F. "The Current School Building Program in Michigan." *The American School and University*. Twenty-Second Annual Edition. New York: American School Publishing Corporation, 1950. p. 221-38.
8. Clark, Harold F. "School Building Costs and Bond Prices." *School Executive* 67: 44, February; 66-67, April; 35-36, June; 53-54, August 1948; 68: 55, December 1948; 68: 89, January; 59, March; 46, May; 16, July 1949; 69: 63, September; 43, November 1949; 69: 53, February; 41, April; 51, June 1950.
9. Clark, Harold F. "Schools and the American Economy." *School Executive* 69: 61-62; January 1950.
10. Cocking, Walter D. "Educational Buildings in 1949." *The American School and University*. Twenty-Second Annual Edition. New York: American School Publishing Corporation, 1950. p. 41-56.
11. Committee on Labor and Public Welfare. *Federal Assistance for Construction of Public Schools.* Hearings Before the Subcommittee on Construction of Educational Facilities, Eighty-First Congress. Washington, D. C.: U. S. Government Printing Office, 1949. 405 p.
12. Council of State Governments. *The Forty-Eight State School Systems.* Chicago: the Council, 1949. Chapters 7-8, "An Examination of School Finance Practices," p. 111-62.
13. Crosby, Otis B. "Removing the Pain from Campaigns." *School Business Affairs* 16: 1-2, 4; October 1950.
14. Dawson, Howard A. "Financing Rural Education." *School Executive* 68: 41-44; March 1949.
15. Dewhurst, J. Frederic, and others. *America's Needs and Resources.* New York: The Twentieth Century Fund, 1947. 812 p.
16. Eckles, William G. "Costs and Financing Procedures." *Bulletin of the National Association of Secondary-School Principals* 132: 220-27; March 1948.
17. Engineering News-Record. "Facilities Control School Building Costs." *Engineering News-Record* 143: 19-23; September 8, 1949.
18. Engineering News-Record. "Quality Check List—Key to School Cost Control." *Engineering News-Record* 143: 40-41; October 27, 1949.
19. Engineering News-Record. "School Costs." *Engineering News-Record* 143: 5; September 8, 1949.
20. Engelhardt, Nickolaus L. "Building Schools When Costs Are High." *American School Board Journal* 116: 39-40; April 1948.
21. Exton, Elaine. "The Schoolhousing Situation—Observations Concerning State and Federal Aid." *American School Board Journal* 118: 61; January 1949.
22. Hamon, Ray L. "Concepts Reflected in School-Housing Bills." *School Life* 32: 42-43, 47; December 1949.
23. Hamon, Ray L. "Educational Plant Needs." *The American School and University*. Twenty-Second Annual Edition. New York: American School Publishing Corporation, 1950. p. 57-62.
24. Hamon, Ray L. "The Race Between School Children and Schoolhouses." *School Life* 32: 8; October 1949.
25. Hamon, Ray L. "State School Plant Assistance." *School Executive* 68: 48-50; November 1948.
26. Harriman, Alonzo J. "A Cost Study of School Plan Types." *Architectural Record* 105: 111-15, March; 98-101, April 1949.
27. Hewes, Harry L. "Finances in the Operation and Maintenance of Schools." *The American School and University*. Twenty-Second Annual Edition. New York: American School Publishing Corporation, 1950. p. 103-108.
28. Hewes, Harry L. "FWA—Builder of Schools." *The American School and University*. Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 67-74.
29. Jarvis, Emerson D. "Goals in Financing School Building Construction." *American School Board Journal* 118: 29-30, 88; May 1949.
30. Jarvis, Emerson D. *Methods of Financing School-Building Construction in the Forty-Eight States.* Doctor's thesis. Columbus: Ohio State University, 1948.

31. JOHNSON, WILLIAM A. "Economy in Schoolhouse Planning and Construction." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 46-54.
32. LEE, GORDON CANFIELD. *The Struggle for Federal Aid—First Phase.* Contributions to Education, No. 957. New York: Teachers College, Columbia University, 1949. 188 p.
33. LINN, HENRY H. "Our Billion Dollar Babies." *American School Board Journal* 116: 23-24; June 1948.
34. MCLURE, WILLIAM P. *Financing Public Education in Mississippi.* Report of a Study of State and Local Support of Mississippi's Schools, Vol. 2. University: Bureau of Educational Research, University of Mississippi, 1948. 71 p.
35. MCLURE, WILLIAM P. *Let Us Pay for the Kind of Education We Need.* Report of a Study of State and Local Support of Mississippi's Schools, Vol. 1. University: Bureau of Educational Research, University of Mississippi, 1948. 151 p.
36. MORPHET, EDGAR L. "Financing School Building Programs." *American School Board Journal* 118: 20-22; September 1949.
37. MORPHET, EDGAR L.; RELLER, THEODORE L.; and BURSCH, CHARLES W. *Report of Cooperative Work-Conference on Financing School Plant Programs—Emergency and Long Range Provisions.* Berkeley: Extension Division, University of California, 1950. 51 p. (Mimeo.)
38. MOULTON, HAROLD G. *Controlling Factors In Economic Development.* Washington, D. C.: The Brookings Institution, 1949. 397 p.
39. NATIONAL COMMISSION ON SCHOOL DISTRICT REORGANIZATION. *Your School District.* Washington, D. C.: Department of Rural Education, National Education Association, 1948. Chapter 7, "Finance as Related to School District Reorganization," p. 89-107.
40. NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION. "Fiscal Authority of City School Boards." *Research Bulletin* 28: 66-69; April 1950.
41. NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION. "School Housing Needs in City-School Systems, 1947-48." *Research Bulletin* 26: 161-64; December 1948.
42. NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION AND AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *Construction Costs of 69 School Buildings Completed During the Period 1947-1950.* Educational Research Service Circular No. 11, 1950. Washington, D. C.: the Association, 1950. 19 p.
43. NATION'S SCHOOLS. "Need $13,000,000,000 for School Buildings." *Nation's Schools* 41: 66; February 1948
44. PERKINS, LAWRENCE B., and COCKING, WALTER B. *Schools.* New York: Reinhold Publishing Corporation, 1949. Chapter 12, "Financing the Education Plant," p. 220-32.
45. SCHOOL BUSINESS AFFAIRS. "Evaluation of Construction Costs." *School Business Affairs* 15: 6; September 1949.
46. SCHOOL BUSINESS AFFAIRS. "Variation in School Building Costs." *School Business Affairs* 15: 6; December 1949.
47. SCHOOL LIFE. "20-Year School Building Aid Law." *School Life* 32: 79; February 1950.
48. SCHOOL MANAGEMENT. "13.5 Billions Are Needed for New Buildings." *School Management* 19: 8; May 1950.
49. SCHOOL MANAGEMENT. "What Factors Make School Bond Campaigns Successful?" *School Management* 19: 23; May 1950.
50. SIMPSON, ROY E. "The New Program of State Aid for School Building." *California Schools* 21: 3-5; January 1950.
51. SURVEY OF CURRENT BUSINESS. "Monthly Business Statistics." *Survey of Current Business* 30: S1, S5; November 1950.
52. THURSTON, LEE M. "The State's Responsibility in Education." *School Executive* 69: 58-63; October 1949.
53. VAN NUYS, JAY C. "The Economy of Contemporary Design." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949. p. 55-58.

CHAPTER VII

School-Plant Operation and Management

JOHN E. PHAY and JAMES W. HUNT

PROBLEMS of operation, maintenance and insurance of the school plant, and school-plant rehabilitation as treated in the literature of the period covered by this review are summarized in this chapter. Actually little research has been done in school-plant management during the last three years. The educational literature in this area, for the most part, describes practices of individual schools on various topics included in the area. Such described practices may be extremely important, however, because in many cases, the described practice is the one accepted after other methods have been used and discarded. A bibliography for the entire area of school-plant management was prepared by Viles (42).

Personnel Problems of Plant Operation

A major study of school custodial services was made by Viles (39). In this U. S. Office of Education publication, Viles placed major emphasis on a training program for custodians. Units comprising a training course were suggested. Phay (31) described the condition of custodians in cities above 30,000 in population with respect to salaries and salary schedules, working hours, vacations, sick leave, retirement, tenure, and organized labor groups. He presented 33 recommendations in these areas.

Selection

Methods of selecting custodians and maintenance personnel were reported by Zepp (45) who suggested the use of what amounts to an intelligence test. The *Nation's Schools* recommended the use of a psychiatrist to determine a custodian's fitness to associate with children. Hopper (20) suggested that custodians be required to be certificated by an examining board. Advantages to the community resulting from custodian certification were safety, efficiency, and economy. In turn, the custodian profited in the improved dignity of his position and in greater job stability.

Custodial Training

The practice of providing courses for training custodians is increasing. Training programs have been provided by some state departments of education, cities, schoolboards, and institutions of higher learning. For those contemplating an inservice training program for custodians Bliss (10) suggested one approach. Crone (13) reports an inservice night school program for custodians that appears adaptable to most city school systems. For improving custodial efficiency, Hopper (19) suggested sending some custodians to school each year at the expense of a schoolboard.

Viles (39, 40) described six types of training programs and suggested a program of study.

Salaries and Salary Schedules

The National Education Association (27) issued the second in a contemplated series designed to list salary information of operation and maintenance employees for school systems over 30,000 in population. The National Education Association found a general salary increase of $500 to $600 a year and a work-week decrease of two hours for school operation and maintenance employees in 1946-47 over 1942-43. Salary schedule provisions in 1948-49 for custodial workers in cities over 100,000 in population were reported by the National Education Association (28) for 17 cities. Covert (12) reported the practice of yearly determining the custodian's salary by an appraisal of salaries received by similar workers in other establishments. He stated that agreement on salaries was reached by representatives of the custodians and the administration.

Custodial Relations

Hynds (23) indicated the desirability of securing a good working relationship between custodians and school administrators. He suggested aids for improving relationships which included a labor-management committee. Barbour (8) suggested that schoolboards can do much to promote good feeling among custodians. The rating scale of the St. Louis janitorial and engineering staff was listed by the *American School Board Journal* (4). Barbour (7) suggested that administrators give assistance to custodians in their record keeping and suggested specific aid that will help the custodian with his records.

A movement for a new organization that will include all school-building operators was reported by Resch (32) who thought such an organization superior to separate organizations for janitors, custodians, and engineers.

The *Nation's Schools* (29) recommended the use of uniforms for school employees as an aid to morale, to add dignity to the position, and as an aid in promoting better personnel relations.

A system utilizing a roving caretaker, who goes from one school to another to relieve regular custodians for half-day periods, was described by Huggins (22). In Huggins' situation, the roving custodian was used so that the work week of the regular custodian did not exceed the normal number of hours.

Housekeeping

Most of the literature on methods of cleaning school buildings was confined to articles and pamphlets. An exception to this was the book of Linn, Helm, and Grabarkiewicz (26) which gives detailed information telling how custodians may keep a school immaculate. This book tells the type of materials that should be used for each cleaning operation, the proper way to use cleaning tools, the most efficient methods of sweeping floors, washing windows, and of doing the many other cleaning jobs that go to make up the duties of a custodian. In this book the custodian is told not only what should be done in each housecleaning operation of a school, but also why one type of cleaner or preservative is superior to another. One chapter of this book is devoted to the improving of lighting conditions; elsewhere, general and specific responsibilities of custodians, relationship with other school personnel, work scheduling, and fire prevention are discussed in detail. Here, in one source, is a handbook that thoroly covers school housecleaning.

Vacuum cleaners are becoming more widely used in school housekeeping, according to Smalley (37). He predicted that this method of cleaning will displace the broom and stated that St. Louis used vacuum cleaners in all of its school buildings.

School Management (35) was concerned with accidents that befall custodians. It suggested several procedures that would aid in preventing accidents to custodians. Fair (15) listed 35 rules indicating how utility bills might be reduced. Linn (25) listed several factors that should be given attention if high standards of school housekeeping are to be maintained.

School-Plant Maintenance

Maintenance of school buildings has had its fight for funds from the school budget along with other items. The American Association of School Administrators (2) stated that a preferable method for estimating maintenance cost was to base the cost on at least 1 percent of the current replacement cost of the school plant. Hawkins (16, 17) recommended that 1½ and preferably 2 percent of the building's replacement cost be used for maintenance. As building costs rise, maintenance budgets should be increased.

A good maintenance program will keep major repairs to a minimum. The American Association of School Administrators (2) advised as a policy: (a) periodic surveys and inspection to locate needs before emergencies occur, (b) scheduled expenditures for meeting the needs, and (c) well-trained, well-equipped, and experienced maintenance personnel. Hawkins (16, 17) listed five categories under which a good maintenance program falls.

Zepp (45) described a summer maintenance program and stressed the need for sufficient personnel. Zepp (46) also described the school maintenance program in Massillon, Ohio, in which excellent maintenance is secured at relatively low cost. Smalley (36) suggested that floors might be better protected if more attention were given them between the end of the snow slush and the annual summer renovation. Sarver (33) indicated causes of plaster disintegration, described methods of repair, and suggested steps in determining water leaks.

Interior painting of school buildings can serve more purposes than merely to afford a protective covering of the surface. Baker (6) reported that the city of New York, thru research, found color combinations for school interiors that were a positive aid to the education program. Colors were used that would help create a desired environment. Colors with depressing effects were avoided. Safety colors in shops gave silent warnings to students.

Property Insurance

Rising building costs demand reappraisal of school insurance policies if school districts are to be properly insured. Wolverton (44) suggested five methods of determining insurable values. Eichler (14) outlined steps which should be taken in planning an insurance program. He included such elements as: (a) the determination of replacement values, (b) the selection of the most advantageous insurance plan of fire and extended coverage, (c) the use of the staggered or budget plan for premium payments, and (d) the selection of an insurance broker to unite the policies.

A school fire is one of the major tragedies that may happen to a community. Viles (41) described how fire hazards in school buildings could be eliminated, and Benson (9) listed a four-phase program as being a necessity in order that a school have an adequate fire-protection program.

Vandalism in the Chicago schools was reported by Bachrach (5) to have cost the taxpayers over $2 million in a 10-year period. A committee formed to combat the vandalism was successful in greatly reducing the destruction of school property.

Building Rehabilitation

Rehabilitation of school buildings seems a solution to some of the building problems according to the American Association of School Administrators (3). Increased building costs, few changes in statutory limitations on the schoolboards' bonding capacity, and little increase in the assessed valuation of taxable property were cited as prohibiting the adequate construction of new buildings. Moreover, since enrolment peaks may drop after 1965, it was felt to be a matter of good policy to underbuild permanent construction rather than to overbuild. Before any building is rehabilitated, the Association stated, two questions should be explored: (a) are the buildings structurally and educationally worth rehabilitating, and (b) are the buildings, if rehabilitated, needed in the housing of the community's educational program?

Hosler and Swanson (21) described ways of modernizing old buildings. They discussed renovation of heating systems, plumbing, lighting, and other areas. Adams (1) indicated that modern ideas in remodeling school buildings make for better classrooms. Brown (11) presented a floor plan to show how an old schoolhouse could be remodeled for efficiency and economy. Willis (43) described the modernization and rebuilding of a school that had been partially destroyed by fire.

Starin (38) listed criteria for determining whether a district should remodel or build a new school. Scherer (34) stated that rehabilitating schools should overcome both obsolescence and deferred maintenance.

Bibliography

1. ADAMS, BARCLAY. "Architects Fit Modern Ideas to Old Buildings." *School Executive* 69: 49-50; November 1949.
2. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. "Plant Preservation for Plant Utility." *American School Buildings.* Twenty-Seventh Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. p. 275-81.
3. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. "Rehabilitation of Buildings." *American School Buildings.* Twenty-Seventh Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. p. 262-74.
4. AMERICAN SCHOOL BOARD JOURNAL. "St. Louis Rates School Building Employees." *American School Board Journal* 118: 42; May 1949.
5. BACHRACH, WILLIAM. "Vandalism a Big Business in Public Schools." *American School Board Journal* 119: 33; September 1949.
6. BAKER, LESTER. "Well-Planned Use of Color Can Effect Economical Improvements." *School Management* 18: 6-7; March 1949.
7. BARBOUR, JULIUS E. "Helping the Custodian Keep His Records." *Nation's Schools* 43: 66-68; April 1949.
8. BARBOUR, JULIUS E. "The Custodian Makes the School Team." *Nation's Schools* 43: 66-67; February 1949.
9. BENSON, HORACE H. "Four Phases of an Adequate School Fire Protection Program." *Nation's Schools* 43: 56-58; March 1949.
10. BLISS, SIDNEY M. "How To Inaugurate In-Service Training of Nonteaching Personnel." *American School Board Journal* 120: 41; March 1950.
11. BROWN, STANLEY. "Remodeling an Old Schoolhouse for Efficiency and Economy." *American School Board Journal* 120: 49-51; February 1950.
12. COVERT, JAMES C. "Pontiac Schools Custodial Policy." *School Management* 19: 12; October 1949.
13. CRONE, JAMES M. "Custodians' Night School." *Nation's Schools* 43: 62; May 1949.
14. EICHLER, GEORGE A. "Planning an Insurance Program." *American School Board Journal* 118: 39-40; May 1949.
15. FAIR, ERNEST W. "Utility Bills Can Be Cut if These 35 Rules Are Carefully Observed." *Nation's Schools* 45: 70-72; May 1950.
16. HAWKINS, WALTER C. "A Preventive School Maintenance Program." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949-50. p. 304-305.
17. HAWKINS, WALTER C. "A Program of Preventive Maintenance." *School Management* 18: 15-16; February 1949.
18. HOLDEN, ELLSWORTH B. "The Planning and Construction of School Buildings for Economical Maintenance." *American School Board Journal* 118: 31-33; January 1949.
19. HOPPER, WILLIS O. "How To Attain Custodial Efficiency." *School Management* 19: 26; December 1949.
20. HOPPER, WILLIS O. "New Standards for the School Custodian." *School Management* 18: 20; February 1949.
21. HOSLER, FRED W., and SWANSON, J. CHESTER. "Ways of Modernizing Old School Buildings." *The American School and University.* Nineteenth Annual Edition. New York: American School Publishing Corporation, 1947-48. p. 171-76.

22. HUGGINS, JOHN E. "Operation and Maintenance." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949-50. p. 307-308.
23. HYNDS, HAROLD D. "For Successful Custodial Relations Make the Work Vital and Meaningful." *School Management* 17: 12-13; August 1947.
24. LINN, HENRY H. "Clever Planning for the Improvement of Plant Operation." *School Management* 19: 12-14; May 1950.
25. LINN, HENRY H. "Improving School Housekeeping." *American School Board Journal* 119: 26-28; October 1949.
26. LINN, HENRY H.; HELM, LESLIE C.; and GRABARKIEWICZ, K. P. *The School Custodian's Housekeeping Handbook.* New York: Bureau of Publications, Teachers College, Columbia University, 1948. 255 p.
27. NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION, and AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *Salaries of Employees Engaged in Operation and Maintenance of Buildings in 133 School Systems in Cities above 30,000 in Population, 1946-47.* Educational Research Service Circular No. 1. 1948. Washington, D. C.: the Association, January 1948. 47 p.
28., NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION. *Custodial Workers—Salary Schedule Provision in Public-School Systems, Cities Over 100,000 in Population, 1948-49.* Washington, D. C.: the Association, 1949. 10 p. (Mimeo.)
29. NATION'S SCHOOLS. "Uniforms Make Better Employees." *Nation's Schools* 41: 60-62; March 1948.
30. NATION'S SCHOOLS. "Who Is the Right Custodian?" *Nation's Schools* 41: 58-60; January 1948.
31. PHAY, JOHN E. "Custodian Personnel Administration." *American School Board Journal* 116: 21-22, March; 33-35, April; 25-27, May; 24-26, June, 1948; 117: 29-30, July; 41-42, August, 1948.
32. RESCH, WILLIAM E. "An Association of School Building Operators." *American School Board Journal* 119: 36; August 1949.
33. SARVER, CYRIL C. "Some Common Causes of Plaster Disintegration." *American School Board Journal* 118: 43-44; May 1949.
34. SCHERER, FRANCIS R. "Repair of Buildings and Equipment." *Nation's Schools* 44: 60; December 1949.
35. SCHOOL MANAGEMENT. "When Custodians Protect Themselves They Protect Others." *School Management* 19: 23; April 1950.
36. SMALLEY, DAVID E. "Clean Floors for Closing Days." *American School Board Journal* 118: 41-42; May 1949.
37. SMALLEY, DAVID E. "Vacuum Cleaners for Schools." *American School Board Journal* 116: 46-47; May 1948.
38. STARIN, ARTHUR N. "Do's and Don'ts for Remodeling." *Nation's Schools* 40: 34-37; November 1947.
39. U. S. OFFICE OF EDUCATION. *Improving School Custodial Service.* Bulletin 1949, No. 13. Washington, D. C.: Government Printing Office, 1949.
40. VILES, NELSON E. "Custodial Training Programs." *American School Board Journal* 117: 15-17; August 1948.
41. VILES, NELSON E. "Reducing Fire Hazards in School Buildings." *School Management* 18: 13-15; December 1949.
42. VILES, NELSON E. "School Plant Management Bibliography." *School Management* 19: 24-25, December, 1949; 10-11, January; 8-12, February, 1950.
43. WILLIS, HAROLD B. "Modernization and Rebuilding of an Old High School, Weston, Massachusetts." *The American School and University.* Twenty-First Annual Edition. New York: American School Publishing Corporation, 1949-50. p. 64-66.
44. WOLVERTON, FORREST E. "Insurance on School Property." *School Management* 19: 4; December 1949.
45. ZEPP, HERMAN S. "Don't Stint on Manpower for Maintenance or on Mechanical Equipment if You Want a Good Job Done at Reasonable Cost." *Nation's Schools* 43: 58-60; January 1949.
46. ZEPP, HERMAN S. "Supervision of Operation and Maintenance in Massillon, Ohio." *School Management* 18: 8-9; January 1949.

CHAPTER VIII

Needed Research in the School-Plant Field

ARCHIE L. GRAY

THE lag is in the construction of school buildings caused by shortages of materials and labor during the past several years has resulted in boosting current estimates for needed school-plant construction to at least $15 billion.

It is imperative that complete data concerning the varied functions of the needed school plant and the costs and efficiencies of materials and processes required to produce the plant be made available to those responsible for planning the school plant. The school plant should provide an environment designed to be used in the development of desirable concepts, skills, attitudes, and behavior in individuals who are living in the school community. It must provide educational facilities for elementary- and secondary-school students including children of kindergarten- and nursery-school ages, and for adults who have the need and desire to improve.

Too many schools have been built without regard to the psychological principles of learning. Consideration should be given to the fact that there is better mastery of basic skills and concepts when they are taught in relation to their use and meaning. Learning is easier and more permanent when students are interested and happy in the content, procedures, and social contacts of the task.

While information concerning many factors has been supplied by previous research and experimentation in the general building field as well as in the school-plant field, there still exists a great necessity for further research if there is to be economy of both time and money in the necessary construction.

A number of excellent suggestions on the need for school-plant research have been reported. Hamon (3), in a previous number of this REVIEW, presented a well-organized recapitulation of earlier lists and added many of the then current subjects. Clapp (2) listed a series of problems in the form of questions and suggested both the collection and organization of previous research studies concerning existing buildings and experimental school buildings. The Commission on American School Buildings of the American Association of School Administrators (1) devoted a chapter of its yearbook to unanswered questions in the school-plant field. Holy and Herrick (4), in the 1950 edition of the *Encyclopedia of Educational Research*, presented a list of basic problems in the location, planning, construction, and operation of school buildings. The National Council on

Schoolhouse Construction (5) presented a guide for planning school plants giving specific recommendations which are educationally acceptable and feasible at this time.

The following enumeration of some of the more specific subjects on school-plant research indicates the main areas in which current fundamental research is needed. This list is not intended to be entirely new, because many of the fields mentioned in previous listings of school-plant research subjects are still in need of further investigation.

Planning

In planning a new school plant there is need for investigations which will provide: (a) implementation of long-term planning to fit the functional requirements of a dynamic educational situation with components such as the expanding role of education, changing to broader curriculums, changing methodology, growing and shifting population and occupational trends, (b) methods of securing active participation on the part of the staff, students, and people in the community so that schools may be planned from the inside out, (c) the apportionment of floor space to different school activities such as instruction, administration, library, physical education, health service, shops, laboratories, classrooms, and auxiliary and community services, (d) greater flexibility and expansibility in structural plan and building materials to permit ready adaptation to the changing personnel, content and methodology of education, (e) accessibility and contiguity of functionally related areas to provide efficient and uncongested student, material, and vehicular traffic, and (f) multiple use of space to approach more closely the full-time use of the different areas of the building and the site.

Finance

Obtaining the greatest value for the taxpayer's dollar necessitates detailed study of the following problems: (a) securing the active support of the tax-paying public, (b) fiscal resources other than local support, with provision for equalization, (c) relation of a pay-as-you-go plan to borrowing by bonding, (d) ascertaining community fiscal capacities thru studies of productive abilities and economic resources, (e) determining suitable legal tax rates, (f) establishing building funds, (g) setting suitable limits for bonded indebtedness, (h) reducing costs of raising money by sale of bonds thru information concerning legal steps, timing, marketing, and retirement, (i) reducing interest costs, (j) developing procedures for strict accounting of monies, (k) cost designing every possible, practical, structural combination for which materials are available, (l) proper timing for the submission of bids, (m) evaluating technics for reducing insurance premiums, and (n) comparing the relative merits of self-insurance with other types of insurance.

Architectural Services

Relatively little significant research concerning architectural services has been reported. There is need for studies leading to knowledge of: (a) architectural, contractual, and administrative procedures, (b) standards of training for the architect, the consulting specialist and the superintendent in connection with school planning, designing, and construction supervision, (c) the relative merits of concentration and division of responsibility, (d) definitions of adequate and proper working plans and specifications, and (e) the development of standard forms of equitable building contracts and bonds, based upon studies of court decisions, state laws, and local regulations.

Codes

There is a tremendous need for the revision of existing codes by the translation of summaries of research results into reasonable accomplishment standards.

Sites

Research is needed to determine areas proper for newer school designs which stress physical education, outdoor education, laboratory training, transportation facilities, and community centers. The following problems in this field need further study: (a) the size, selection, and location of sites suitable to the educational program, (b) availability of sites in more congested areas, and (c) adaptation of building to sites.

Construction

There is need for research on the following problems of school-building construction: (a) determining the most efficient size of building in relation to construction, operation, and maintenance costs, (b) evaluating suitable building materials, taking into account original cost, availability, and utility, (c) securing optimum effectiveness of exterior and interior finishing materials to determine the simplest and most economical combination that will wear well and retain a pleasing appearance, (d) developing designs which are functional, flexible, expansible, and are also pleasing, healthful, and safe, (e) introducing efficient practices with new-type materials and designs, (f) popularizing the use of modular design and prefabrication, including on-site prefabrication, (g) reducing of total labor expense for on-site labor by reducing the skills involved in construction, (h) securing satisfactory acoustics depending upon amount of sound control and types of materials needed for best results in different areas, and (i) modifying the design, color, and trim, of both the interior and exterior of school buildings (including landscaping) according to the way they affect pupils and personnel.

Equipment and Furniture

Good serviceable furniture and equipment is absolutely necessary for optimum child development. There is need for research in this field concerning: (a) efficient, economical planning and installation of instructional and service equipment and furniture, and (b) design, color, performance, specifications, and standards of instructional and service equipment and furniture.

Service Systems

While there has been extensive research concerning service systems, many of the results have been inconclusive and controversial. The main areas for needed research involve the evaluation of: (a) natural and artificial lighting, (b) heating and ventilation, (c) sanitary provisions and facilities, (d) provisions for the convenient and effective utilization of intercommunication, projection, radio, and other audio-visual equipment, and (e) requirements for safe, efficient, and economical transportation including provisions for repair, service, and storage facilities. Of these, the first three need amplification.

Among the controversial or unanswered questions in classroom lighting are: (a) what are the illumination conditions (intensities, brightness ratios, etc.) under which efficient and comfortable seeing for different school activities are made possible, (b) how are these conditions affected by window placement, louvering, external fins, reflection factors, and classroom management, (c) what is the physiological effect of long exposure of natural lighting on the working surface, (d) is automatic photronic control feasible as a solution of light variability, (e) what are the effects of building orientation, room widths, and ceiling heights on lighting, (f) what is the relative illumination thru different types of transparent, translucent, or directional panes and blocks, (g) is natural lighting originating below eye level effective or suitable, (h) what is the effect of different types and colors of window shades and wall finishes on natural lighting, (i) what are the conditions of arrangement and area of windows and translucent areas, (j) what is the effect of size of windows and mullions on natural lighting and visibility in the classroom, (k) what is the effect of placement of equipment on classroom lighting, (l) is unilateral lighting suitable for classrooms where tables and chairs are used, and (m) is multilateral lighting suitable for the colder climates?

In the field of heating and ventilation the following are some of the unanswered questions: (a) Is window-gravity-ventilation feasible and satisfactory in all climates and seasons? (b) If mechanical systems of heating and ventilating are used, what are the optimum volumes of air per pupil, numbers of air changes, and proportions of fresh and recirculated air? (c) What are the optimum temperature and humidity conditions for health and alertness in the different school activities? (d) Can air conditioning be provided successfully and economically under typical school conditions? (e) What ventilation problems arise because of differences in building design and material? (f) What economies can be effected by separate heating circuits for areas used only part-time? (g) To what extent, and by what means is air sterilization desirable and feasible? (h) In radiant heating, what are optimum panel areas, locations, and temperature? (i) What controls may be used to compensate for heating and cooling lags in radiant heating?

Unanswered questions concerning sanitary systems include the following: (a) What are the special requirements of ventilation in toilets and locker rooms? (b) To what extent and under what conditions are germicidal lights and aerosols effective? (c) What are the toilet requirements for different pupil-age levels and types of activities? (d) What are the requirements for drinking, bathing, and washing facilities in the whole school program?

Maintenance and Operation

In the field of maintenance and operation, the principal questions on which further research is needed are: (a) What are the maintenance and operation costs of schools in relation to such factors as size of building, types of construction, uses and climate? (b) What is the proper care of new-type materials in different climates? (c) Under what conditions should a building be repaired, remodeled, or replaced?

Need for Coordinated Research

It is not enough merely to undertake the isolated investigation of these important problems of the building program. The results of the researches must be made available and understandable to those who are actively engaged in the planning and construction of schools. That is, the voluminous information in completed research studies must be collected, evaluated, condensed, summarized, interpreted, and distributed to those who need it. There is a need for a cooperative attack on this important research area in a comprehensive and scientific manner.

It is believed that this problem can be handled most effectively by encouraging administrative officers to help in securing funds, in answering questionnaires, in rendering other requested services to the existing research centers including city schools, state departments of education, universities, and such national organizations as (a) The National Council on Schoolhouse Construction, (b) The National Education Association, (c) The American Council on Education, (d) The American Institute of Architects, and (e) The United States Office of Education. To provide the necessary personnel for work on school-plant problems in the research centers, American colleges must train more students in the school-plant field.

Bibliography

1. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *American School Buildings.* Twenty-Seventh Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. 525 p.
2. CLAPP, WILFRED F. "The Need for Plant Research." *The American School and University.* Twentieth Annual Edition. New York: American School Publishing Corporation, 1948. p. 30-31.
3. HAMON, RAY L. "Needed Research in the School-Plant Field." *Review of Educational Research* 18: 5-12; February 1948.
4. HOLY, THOMAS C., and HERRICK, JOHN H. "School Plant." *Encyclopedia of Educational Research.* (Monroe, Walter S., editor.) Revised edition. New York: The Macmillan Company, 1950. p. 1098-1121.
5. NATIONAL COUNCIL ON SCHOOLHOUSE CONSTRUCTION. *Guide for Planning School Plants.* Nashville, Tennessee: the Council, 1949. 173 p.

Index to Volume XXI, No. 1

Page citations are made to single pages; these are often the beginning of a chapter, section, or running discussion dealing with the topic.

Acoustics, 19, 21
Art, classrooms, 19
Audio-visual aids, 18, 39

Blackboards, 18
Bonds, 54
Building costs, 44; predicted, 45
Business education, classrooms, 20

Classrooms, art, 19; business education, 20; design, 17; elementary, 17; equipment for, 18; flexible partitions for, 20, 31; homemaking, 21; industrial arts, 22; multipurpose, 23, 31; music, 23; planning, 17; physical education, 24; secondary, 19; science, 24
Cleaning, school plants, 59
Construction cost, 51; economy in, 52
Cost indexes, school-plant, 51
Costs, needed research on, 66; of plant construction, 51; of plant expansion, 5
Custodians, salaries, 58; selection, 57; training programs, 57; work standards, 58.

Debt limitations, 54
Decoration, of school plant, 37, 60
Design, of classrooms, 17; principles of, 10, 28, 29; trends, 28, 33

Enrolment, prediction, 5
Equipment, for elementary classrooms, 18; for high-school classrooms, 19; needed research on, 67

Federal aid, for school plants, 6, 49
Finance, future resources, 47; needed research in, 65; school-plant, 44
Fire, insurance, 60

Gymnasiums, 24

Handicapped children, school-plant facilities for, 19
Heating, 40; needed research on, 67
Home economics, classrooms, 21

Illumination, 20, 36
Industrial arts, classrooms, 22
Insurance, fire, 60; of school plants, 60
Interest rates, on bonds, 54

Legislation, for building construction, 6
Lighting, 20; and decorating, 37; natural, 37; needed research on, 67; principles, 36

Maintenance, needed research on, 68; of school plants, 59
Materials, school-plant, 28, 33, 53
Multiple use, of classrooms, 23; of school plants, 19, 31
Music, classrooms, 23

Operation, needed research on, 68; school-plant, 57

Personnel, custodial, 57
Physical education, school-plant facilities, 24
Planning, classrooms, 17; coordination, 12; needed research in, 65; organization, 11; personnel, 11; procedures, 10; school-plant design, 29; use of committees in, 11; use of consultants in, 12
Plant, (see School Plant)

Resources, financial, 47

Safety, in building construction, 28
Salary schedules, for custodians, 58
Sanitary facilities, 39
School-plant, facilities for special education, 19; federal aid, 6, 49; finance, 44; future needs, 5; heating and ventilation, 40; lighting, 36; maintenance, 59; materials, 28, 33, 53; modernization of, 61; multiple use of, 19; needed research, 64; operation, 57; planning, 5, 10; plumbing and sanitation, 39, 59; programs, 5; rehabilitation, 60; space requirements, 17; state aid, 6, 49; status, 5
Secondary, classrooms, 19
Science, classrooms, 24
Sites, 29; needed research on, 66
Space requirements, 17
Special education, school-plant facilities for, 19
State aid, for school plants, 6, 49

Toilet facilities, 18, 39

Ventilation, 40; needed research on, 67

Work standards, for custodians, 58

This issue of the REVIEW was prepared by the
Committee on Counseling, Guidance, and Personnel Work

D. WELTY LEFEVER, *Chairman,* University of Southern California, Los Angeles, California
PHILIP A. BOYER, Philadelphia Public Schools, Philadelphia, Pennsylvania
PAUL L. DRESSEL, Michigan State College, East Lansing, Michigan
WALTER J. GREENLEAF, U. S. Office of Education, Washington, D. C.
C. GILBERT WRENN, University of Minnesota, Minneapolis, Minnesota

with the assistance of

DUGALD S. ARBUCKLE, Boston University, Boston, Massachusetts
EARL F. CARNES, University of Southern California, Los Angeles, California
PAUL J. DANIELSON, University of Wisconsin, Madison, Wisconsin
MINERVA F. DESING, Philadelphia Public Schools, Philadelphia, Pennsylvania
FRANK J. ESTVAN, University of Southern California, Los Angeles, California
CLIFFORD P. FROEHLICH, U. S. Office of Education, Washington, D. C.
MARY ALICE LAIRD, Philadelphia Public Schools, Philadelphia, Pennsylvania
WILLIAM A. MANN, Michigan State College, East Lansing, Michigan
CHARLES E. MEYERS, University of Southern California, Los Angeles, California
RAYMOND C. PERRY, University of Southern California, Los Angeles, California
JOHN W. M. ROTHNEY, University of Wisconsin, Madison, Wisconsin
ELMER E. WAGNER, University of Southern California, Los Angeles, California
JANE WARTERS, State Teachers College, Lock Haven, Pennsylvania

FOREWORD

THE heightened activity of the postwar period is clearly reflected in an increase in the amount and the quality of research of interest to the guidance worker. Much of this research is concerned with a clearer understanding of the individual as he interacts with his social environment. Studies of the problems of subcultures in the United States and of the significance of social class have contributed much to this insight.

Concern over the number of adolescents leaving high school before graduating has led to more careful analyses of possible causal factors. Among these factors, dissatisfaction with the school situation and evidences of emotional maladjustment have outweighed economic need. The nationwide trend toward annual promotion, the reduction of retardation, and provision for continuous progress without specific grade-level boundaries is receiving greater emphasis than ever. Relatively few attempts have been made to present a comparative evaluation of the different varieties of guidance programs. Most of the literature in the area of organization, plans, and programs consists of descriptive surveys.

An effort has been made to understand the "unique" individual thru a patterned study of many characteristics. Personality dimensions, social status, and self-evaluation are among the kinds of factors under scrutiny. A more dynamic view of appraisal appears to be evolving in which status measures will be replaced by indicators of growth and of the possibility of change in status.

The literature dealing with counseling technics is still in the discussion stage, or, at best, in an exploratory period. Here and there the beginnings of clear-cut evaluation may be seen, presaging more and better research.

Cultural factors operating in the school society have been investigated by means of sociometric technics, case studies of leaders, and the analysis of social status indexes. Emphasis is clearly shifting to the study of groups as they form the living structure of the social environment. The intelligent exploitation of the interacting groups composing the school society would appear to be a major challenge to the guidance program.

The problem of increasing the functional literacy of the United States is being solved as shown by the decline in illiterates from 1.5 million in 1940 to fewer than 1 million in 1947. Enrolment statistics contribute added weight to the previously mentioned institutional research on high-school drop-outs.

More nearly complete and thoro job analyses of the work of counselors are needed. A beginning in this field has been made, however. Proposed training programs for guidance workers do not match the actual backgrounds possessed by such professional personnel. Little, if any, validation of certification requirements has been attempted.

D. WELTY LEFEVER, *Chairman*
Committee on Counseling, Guidance, and Personnel Work

CHAPTER I

Characteristics and Needs of Individuals

CHARLES E. MEYERS, FRANK J. ESTVAN, and RAYMOND C. PERRY

Introduction and Bibliographical Note

RESEARCH on the basic qualities, characteristics, and needs of individuals and groups as related to counseling and guidance which has appeared during the three-year period of this review is summarized in this chapter. Over 300 bibliographical items were examined. It is hoped that the resultant bibliography is a representative sample. To conserve space many items listed are not discussed in the text; the bibliography is composed almost exclusively of reports with new data. In some cases an entire series of excellent papers is represented only by a recent number. Examples of the latter are the series on handedness by Hildreth (37) and the case analyses by Wells (97).

Physical Growth, Physique, Motor Function

Data on both the longitudinal and cross-sectional variety have appeared. Jones and Bayley (47) contrasted some early and late maturing adolescent boys and found that the former showed maturity in emotional and social characteristics while the latter revealed many evidences of immaturity, often with psychologically compensating mechanisms. With similar data Jones (46) and Nevers (62) made longitudinal studies of strength development, associating it with pubertal and other factors. Early maturers were stronger and superior in athletics. In girls there appeared some arrest in strength development with the completion of puberty while boys continued to advance in strength thru the teens.

Meredith (55) presented evidence that first-born are smaller at birth. Data for later infancy and up to at least 14 years indicate that at these ages the first-born become taller tho not heavier. Beal (10) found some growth deficiency in diabetic children. The menarche and the nature of the menstrual cycle were studied in Mooseheart girls by Reymert and Jost (73). Reynolds and Schoen (74) reported on identical triplet boys followed from ages two to 18. Burks and Roe (15) presented evidence regarding four pairs of identical twins separately reared and found no new conclusive evidence favoring a nurture or nature thesis. Sheldon and others (77) produced the third volume of their series, relating somatypes to psychiatric and criminal applications.

Data for health, disease, mortality, and other aspects of physical welfare in Negroes have been analyzed from census reports (28). Two studies of infants merit attention. Balint (7) examined sucking phenomena in infants while Kunst (51) made a detailed study of the frequency and occasions of thumb- and finger-sucking, showing their relation to hunger state, food intake, and other factors.

The most celebrated research in the three-year period is probably the extensive report on sexual behavior in males, by Kinsey, Pomeroy, and Martin (48). Data based on interviews and histories were sorted by age, marital state, socio-economic status, religion, and other factors. The interrelation of factors with emergence and development of sexual outlets was presented in great detail. The validity of the findings was examined by "re-takes" and other means. The results revealed more other-than-legal and other-than-marital sex experiences than have generally been believed characteristic of the American male. They showed considerable sex concern and activity previous to puberty, and a wide range of sex vigor, frequency of outlet, and mixing of experiences.

Mental Development, Personality

Factor analysis, utilizing the complex manipulation of axes, continued to be used for the study of component factors. However, most of the research was concerned mainly with technical aspects of the method. Such a study was North's (63) in which two primary dimensions were suggested to describe Guilford's STDCR, the Kuder, and the Army GCT.

Swineford (86) studied the nature of the general, verbal, and spatial bi-factors. She demonstrated that these bi-factors maintain their same relative importance for groups which differ widely in mental maturity or in brightness, and that each bi-factor has its own characteristic growth curve. Kleemeier and Dudek (49), on a battery of 13 tests at the college level designed to measure numerical, perceptual speed, and verbal factors, extracted four factors which could account for performance on "shifting tests"; they concluded there was no need to postulate flexibility or a perseveration factor. Jeffress (43) considered problems in factor analysis having to do with mixed populations or combining unlike populations, arriving at factor compositions not too like those of homogeneous groups. Clark (17), in a study of five levels of the *California Test of Mental Maturity* to determine age change in specific abilities, found approximately the same number of factors was required to account for the variance in mental abilities at the primary and elementary levels as at the high-school age.

Adcock (1) continued the use of factor analysis in the field of personality, studying Sheldon's table of intercorrelations by means of the Thurstone multiple group method, and obtained four factors to explain data which otherwise proved difficult to analyze. Spearman and Jones (82) reviewed many studies and consolidated them into a thoro argument for the major theses of the *Abilities of Man.*

The growth and consistency of intelligence continued to be investigated. Honnik, MacFarlane, and Allen (39) tested 252 children between two and 18 years with widely varying results; altho between six and 18 there is a suggested mental test stability, there are many individual deviations of considerable amount. Bayley (9) studied the consistency and variability in the growth of intelligence from birth to 18 years. Thorndike (91) examined 1004 youths with two or more testings on the *ACE Psychological Examination* and supported the Freeman-Flory finding of increasing ability in those remaining in school. Knehr and Sobol (50) found that the mental ability at early school age of 99 prematurely born children was not inferior.

An unusually complete and significant report was that of Terman and Oden (88) in their 25-year follow-up study of 1528 subjects. As a result of extensive field studies relative to physical, mental, educational, occupational, marital, and other adjustments, the senior author is still convinced that the IQ level is one of the most important facts that can be learned about any child. Skodak and Skeels (80) reported their "final follow-up" of children of inferior parentage placed in adoptive homes in early infancy. The subjects, this time tested at ages ranging from 11 to 19 years, maintained superiority to their natural parents, and resembled the "own children" of families like those in which they were placed. Other Iowa studies of similar vein were reported by Skeels and Harms (78), and by Skodak (79).

Other phases of intellectual activity were investigated by Thorndike (90) in a study of the community factors related to intelligence and achievement of school children; by Foulds (22), who studied 5000 British men on various tests to determine variations in the intellectual activities of adults; and by Hood (40), who analyzed the scores of 401 deaf children to learn that their mean IQ was approximately the same as for hearing children.

Fifteen variables were examined by Harris (31). In this preliminary factor analysis study many loadings were unexplained, but the methodology was promising. Vocabulary differences and abilities were investigated by Feifel and Lorge (21), Fox (23), and Traxler (92) on various age levels from infancy to 79. Feifel and Lorge found a qualitative evaluation of the Stanford-Binet vocabulary section an aid in supplementing other sources of data concerning the child's thinking process, while Fox found no significant difference in the quality of definitions given between those in their forties and those in their seventies.

Hahn (29), recording the speech of 116 first-grade pupils, discovered all the types of speakers observable in college speech classes represented among the children. Pratt (68) examined the use of indeterminate number concepts in children of Grades II to XI. Gewirtz (24) attempted with rhymes, alliterations, and other devices to approximate Thurstone's verbal-fluency factor in children five to seven, and related it to other factors. Other developmental studies of mental and conceptual life are: Nagy (60) on theories of death, three to 10 years; Ames and Learned (2, 3) on verbalization of space, and smiling and laughing, 18 months to four years; Synolds and Pronko (87) on color discrimination, three to eight years;

a follow-up study of Shirley's babies was made after 15 years by Neilon (61). He found considerable maintenance of individuality of personality when descriptions of the children at adolescent ages were compared with those Shirley orginally made.

The art content preferred by primary-grade children was determined by Dietrich and Hunnicutt (19) who compared boy and girl preferences among seascapes, landscapes, people, and various degrees of brightness. Using the ACE test, Borg (14) found no significant difference between the intelligence of art majors and other college students. There were many other scattered, but nevertheless important, studies in various fields. Owens and Johnson (65) measured the personality traits of college underachievers. Lehman and Heidler (53), in a study of chronological age vs. literary output, noted that the "best" years might be any between 20 and 75, but more likely 25 to 45. Harvey (34) examined the consistency of philosophical attitudes in persons untrained in philosophy and found their beliefs to be inconsistent.

Miscellaneous Needs and Problems

Sanders (76) demonstrated security as a factor in social adjustment at different ages. Winker (99) compared ages and sexes on the *Wishes and Fears Inventory*. Volberding (94) compared children who were socially and academically successful with those who were not. Yarrow (100) reported little difference on projective play between control and frustrated groups at preschool age. Young (101) compared 218 preschool children with a previous group of 1320 college students; Williams (98) examined similar problems at the high-school level.

During this period a significant publication for counselors was the Purdue Opinion Poll (69). In this report 15,000 students of high-school age indicated their reactions to the things that bother them most such as the school, the home, the things they would like to know about, etc. College students' problems were investigated by Rose (75) and Hunter and Morgan (41). Studies of veterans' problems continued, altho there were few unique contributions. Hardaway (30) and Miller and Brackin (56) studied veterans to facilitate their handling by veteran centers, and Moore (58) summed up the problem by noting that the effect of the war on the ability to adjust to a campus situation was evident but easy to exaggerate.

Glasner (25) studied 70 stutterers under five years, finding they had many emotional manifestations other than stuttering. Tyszkowski and Laslett (93) analyzed the physical characteristics of physically handicapped college students in their attempts to carry college work. Cruickshank and Dolphin (18) analyzed the emotional needs of crippled children and found them similar to those of the noncrippled except in cases wherein the handicap functionally represented something irreparable to the child or constituted an unacceptable factor. Birkeness and Johnson (13) investigated differences between delinquents and nondelinquents. Mangus

(54) found the average level of personality maladjustments significantly higher among farm children than among urban children.

Norvell (64) thoroly appraised interest in 1700 literary selections in Grades VII thru XII and showed sex to be the primary differential. Film choices of 2069 British adolescents were given by Wall and Smith (96). Andersen (4) noted sex differences in the hobbies of 686 junior high-school students. Heisler (36) found no differences of note between elementary-school children who indulged excessively in movies, radio, and comics and those who seldom indulged. Bateman (8) related vocational choice to work experience and Moser (59) related vocational choice to ability. Lawrence (52) reported on Negro aspirations in 13 high schools. Thorndike (89) reported on the permanence of interests, and Jersild and Tasch (44) on wishes, likes, and dislikes of pupils in Grades I thru XII.

Subcultures and Social Class

A definite trend in recent research has been toward the examination of the characteristic values, needs, and problems of the subcultures in the United States and the significance of social class. A variety of approaches has been employed to study concepts and attitudes about minority groups. Zeligs (103) used her *Intergroup Attitudes Test* to study 12-year-old ethnic group members over a period from 1931 on. Hartley (33) used the recorded interview. A social episode test consisting of interview questions and pictures was administered by Radke, Trager, and Davis (72). An interview-doll play technic was the basis for the study made by Radke and Trager (71). These investigations have uniformly revealed the early emergence and persistence of certain minority-majority group stereotypes. Gough (27) found a relationship between these concepts and certain personality factors, but much remains to be done in this area. Goff (26) interviewed 150 Negro boys and girls and parents to determine the effect of these stereotypes of minority-group children. Social pressures were found to transcend selective factors such as geographical location, socio-economic level, and skin shading, and produced feelings of resentment in Negro children. That this awareness of inferior state is present in five-year-olds was revealed by Clark and Clark (16).

The effects of social class on developing personalities has also been of great interest. Social-class differences in the identification of sex roles, and their effect on personality integration were pointed out by Milner (57) and Rabban (70). Analyzing the social behavior of 735 adolescents of both sexes, Hollingshead (38) concluded that social class is significantly related to major functions such as education, vocation, religion, recreation, and socialization. Volberding (95) similarly reported social class differences in the out-of-school life of 11-year-old children, especially with reference to living space, play activities, and radio listening. Characteristic also of this kind of approach is the study of Havighurst and Taba (35) who used a social-class orientation as the focal point for their comprehensive analysis of character formation in adolescents. A relationship was found between types of character identified and social class.

Home and Neighborhood Influences

Major attention was given to the role of parent-child relationships in adjustment. Spitz (84) discovered that the emotional interchange between child and mother was related to the mortality rate of institutionalized children. Stout and Langdon (85) in a study of 158 children six to 21 revealed that parental attitudes such as love, acceptance, and respect were the explanatory factors for good adjustment. The influence of democratic parents on nursery-school behavior was studied by Baldwin (6). From his investigation of 100 junior high-school pupils, Beals (11) concluded that the most important factor in the development of a well-adjusted child was the presence of a cooperative and democratic family relationship. That family authority patterns are transmitted to children if both parents practice a consistent policy was revealed by Ingersoll (42).

Group Processes

Altho theory still outruns research in this area, several interesting developments have taken place. Berenda (12) demonstrated that peer influence is greater than the teacher's in causing a child to give wrong responses in spite of his knowledge of fact. The converse, the effect of one child's action on the group, was investigated in a summer camp for disturbed children by Polansky, Lippitt, and Redl (67). Harris (32) employed a variety of technics to study the reactions of kindergarten children to the behavior of their classmates. Analyzing the friendships of 487 sixth-grade children, Austin and Thompson (5) found that personality was the most important factor influencing children's selections followed by propinquity and similarity of interests. Investigations of the group process were extended to the college level during this period. Evans and Wilson (20) reported a high relationship between the friendship choices of 148 university women students and such factors as geographical proximity, class in university, and religion. Studying the acquaintanceship and social status of 326 freshmen and sophomore women in physical education classes, Skubic (81) concluded that the number of social isolates decreases as the members of the group become better acquainted.

Bibliography

1. ADCOCK, C. J. "Factorial Examination of Sheldon's Types." *Journal of Personality* 16: 312-19; March 1948.
2. AMES, LOUISE B. "Development of Interpersonal Smiling Responses in Preschool Years." *Pedagogical Seminary and Journal of Genetic Psychology* 74: 273-91; June 1949.
3. AMES, LOUISE B., and LEARNED, JANET. "Development of Verbalized Space in the Young Child." *Pedagogical Seminary and Journal of Genetic Psychology* 72: 63-84; March 1948.

4. Andersen, Esther M. "Study of the Hobbies of Pupils in the Junior High School." *Educational Administration and Supervision* 33: 427-34; November 1947.
5. Austin, Mary C., and Thompson, George G. "Children's Friendships: Study of the Bases on Which Children Select and Reject Their Best Friends." *Journal of Educational Psychology* 39: 101-16; February 1948.
6. Baldwin, Alfred L. "Effect of Home Environment on Nursery School Behavior." *Child Development* 20: 49-61; June 1949.
7. Balint, Michael. "Individual Differences of Behavior in Early Infancy, and an Objective Method for Recording Them." *Pedagogical Seminary and Journal of Genetic Psychology* 73: 81-117; September 1948.
8. Bateman, Richard M. "Effect of Work Experience on High School Students' Vocational Choice as Revealed by the Kuder Preference Record." *Occupations* 27: 453-56; April 1949.
9. Bayley, Nancy "Consistency and Variability in the Growth of Intelligence from Birth to Eighteen Years." *Pedagogical Seminary and Journal of Genetic Psychology* 75: 165-96; December 1949.
10. Beal, Carolyn K. "Body Size and Growth Rate of Children with Diabetes Mellitus." *Journal of Pediatrics* 32: 170-79; February 1948.
11. Beals, Lester M. "A Study of Certain Home Factors and Their Relationship to the Personal Adjustment of Children." *School and Society* 72: 55-77; July 22, 1950.
12. Berenda, Ruth Weinreb. *Influence of the Group on the Judgments of Children, An Experimental Investigation.* New York: King's Crown Press, 1950. 86 p.
13. Birkeness, Valborg, and Johnson, Harry C. "Comparative Study of Delinquent and Non-Delinquent Adolescents." *Journal of Educational Research* 42: 561-72; April 1949.
14. Borg, Walter R. "A Study of the Relationship Between General Intelligence and Success in an Art College." *Journal of Educational Psychology* 40: 434-40; November 1949.
15. Burks, Barbara S., and Roe, Anne. "Studies of Identical Twins Reared Apart." *Psychological Monographs* 63: 1-61; 1949.
16. Clark, Kenneth B., and Clark, Mamie P. "Emotional Factors in Racial Identification and Preference in Negro Children." *Journal of Negro Education* 19: 341-50; Summer 1950.
17. Clark, Willis W. "Differentiation of Mental Abilities at Various Age Levels." *Growing Points in Educational Research.* Official Report of 1949 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1949. p. 39-43.
18. Cruickshank, William M., and Dolphin, Jane E. "Emotional Needs of Crippled and Non-Crippled Children." *Journal of Exceptional Children* 16: 33-40; November 1949.
19. Dietrich, Grace L., and Hunnicutt, Clarence W. "Art Content Preferred by Primary-Grade Children." *Elementary School Journal* 48: 557-59; June 1948.
20. Evans, Mary C., and Wilson, Margaret M. "Friendship Choices of University Women Students." *Educational and Psychological Measurement* 9: 307-12; Autumn 1949.
21. Feifel, Herman, and Lorge, Irving D. "Qualitative Differences in the Vocabulary Responses of Children." *Journal of Educational Psychology* 41: 1-18; January 1950.
22. Foulds, Graham. "Variations in the Intellectual Activities of Adults." *American Journal of Psychology* 62: 238-46; April 1949.
23. Fox, Charlotte. "Vocabulary Ability in Later Maturity." *Journal of Educational Psychology* 38: 482-92; December 1947.
24. Gewirtz, Jacob L. "Studies in Word-Fluency: Its Relation to Eleven Items of Child Behavior." *Pedagogical Seminary and Journal of Genetic Psychology* 72: 177-84; June 1948.
25. Glasner, Philip J. "Personality Characteristics and Emotional Problems in Stutterers Under the Age of Five." *Journal of Speech and Hearing Disorders* 14: 135-38; June 1949.
26. Goff, Regina M. *Problems and Emotional Difficulties of Negro Children as Studied in Selected Communities.* Contributions to Education, No. 960. New York: Teachers College, Columbia University, 1949. 93 p.

27. Gough, Harrison G. and others. "Children's Ethnic Attitudes; Relation to Certain Personality Factors." *Child Development* 21: 83-91; June 1950.
28. Gover, Mary. "Survey of Negro Mortality." *Journal of Negro Education* 18: 215-24; Summer 1949.
29. Hahn, Elise S. "Analysis of the Content and Form of the Speech of First Grade Children." *Quarterly Journal of Speech* 34: 361-66; October 1948.
30. Hardaway, Charles. "Survey of the Characteristics, Opinions, and Attitudes of the Overage Veteran Students at Indiana State." *Teachers College Journal* 20: 12-15; October 1948.
31. Harris, Chester W. "An Exploration of Language Skill Patterns." *Journal of Educational Psychology* 39: 321-36; October 1948.
32. Harris, Esther K. *Responsiveness of Kindergarten Children to the Behavior of Their Fellows.* Society for Research in Child Development Monographs, Vol. 11, No. 2, Serial No. 43, 1948. 184 p.
33. Hartley, Eugene Leonard, and others. "Children's Use of Ethnic Frames of Reference: Exploratory Study of Children's Conceptualizations of Multiple Ethnic Group Membership." *Journal of Psychology* 26: 367-86; October 1948.
34. Harvey, John L., Jr. "Philosophical Attitudes in Untrained Persons." *Journal of Higher Education* 21: 321-24; June 1950.
35. Havighurst, Robert J., and Taba, Hilda. *Adolescent Character and Personality.* New York: John Wiley and Sons, 1949. 315 p.
36. Heisler, Florence. "Comparison Between Those Elementary School Children Who Attend Moving Pictures, Read Comic Books and Listen to Serial Radio Programs to an Excess, With Those Who Indulge in These Activities Seldom or Not at All." *Journal of Educational Research* 42: 182-90; November 1948.
37. Hildreth, Gertrude. "The Development and Training of Hand Dominance: V Training of Handedness." *Pedagogical Seminary and Journal of Genetic Psychology* 76: 101-44; March 1950.
38. Hollingshead, August B. *Elmtown's Youth, the Impact of Social Classes on Adolescents.* New York: John Wiley and Sons, 1949. 480 p.
39. Honnik, Marjorie P.; MacFarlane, Jean W.; and Allen, Lucille. "Stability of Mental Test Performance Between Two and Eighteen Years." *Journal of Experimental Education* 17: 309-24; December 1948.
40. Hood, H. Blair. "Preliminary Survey of Some Mental Abilities of Deaf Children." *British Journal of Educational Psychology* 19: 210-19; November 1949.
41. Hunter, Ruth A., and Morgan, David H. "Problems of College Students." *Journal of Educational Psychology* 40: 79-92; February 1949.
42. Ingersoll, Hazel L. "A Study of the Transmission of Authority Patterns in the Family." *Genetic Psychology Monographs* 38: 225-302; November 1948.
43. Jeffress, Lloyd A. "Nature of Primary Abilities." *American Journal of Psychology* 61: 107-11; January 1948.
44. Jersild, Arthur T., and Tasch, Ruth J. *Children's Interests and What They Suggest for Education.* New York: Teachers College, Columbia University, 1949. 173 p.
45. Jones, Harold D. "Extracurricular Reading Interests of Students in a State College." *School and Society* 72: 40-43; July 15, 1950.
46. Jones, Harold E. *Motor Performance and Growth. A Developmental Study of Static and Dynamometric Strength.* Berkeley: University of California, 1949. 181 p.
47. Jones, Mary C., and Bayley, Nancy. "Physical Maturing Among Boys as Related to Behavior." *Journal of Educational Psychology* 41: 129-48; March 1950.
48. Kinsey, Alfred C.; Pomeroy, Wardell B.; and Martin, Clyde E. *Sexual Behavior in the Human Male.* Philadelphia: W. B. Saunders Co., 1948. 804 p.
49. Kleemeier, Robert W., and Dudek, Frank J. "A Factorial Investigation of Flexibility." *Educational and Psychological Measurement* 10: 107-18; Spring 1950.
50. Knehr, Charles A., and Sobol, Albert. "Mental Ability of Prematurely Born Children at Early School Age." *Journal of Psychology* 27: 355-61; April 1949.
51. Kunst, Mary S. "A Study of Thumb- and Finger-Sucking in Infants." *Psychological Monographs* 62, No. 3: 1-71; 1948.
52. Lawrence, Paul F. "Vocational Aspirations of Negro Youth of California." *Journal of Negro Education* 19: 47-56; Winter 1950.

53. Lehman, Harvey C., and Heidler, Joseph B. "Chronological Age Vs. Quality of Literary Output." *American Journal of Psychology* 62: 75-89; January 1949.

54. Mangus, Arthur R. "Personality Adjustment of Rural and Urban Children." *American Sociological Review* 13: 566-75; October 1948.

55. Meredith, Howard V. "Birth Order and Body Size: II. Neonatal and Childhood Materials." *American Journal of Physical Anthropology* 8: 195-224; June 1950.

56. Miller, Leonard M., and Brackin, Walter H., Jr. "Characteristics of the Population of a Veterans Guidance Center." *Occupations* 27: 253-58; January 1949.

57. Milner, Esther. "Effects of the Sex Role and Social Status on the Early Adolescent Personality." *Genetic Psychology Monographs* 40: 231-325; November 1949.

58. Moore, Harry E. "Campus Adjustment of Veterans." *Sociology and Social Research* 32: 711-17; January 1948.

59. Moser, Wilbur E. "Vocational Preferences as Related to Mental Ability." *Occupations* 27: 460-61; April 1949.

60. Nagy, Maria. "The Child's Theories Concerning Death." *Pedagogical Seminary and Journal of Genetic Psychology* 73: 3-27; September 1948.

61. Neilon, Patricia A. "Shirley's Babies After Fifteen Years: Personality Study." *Pedagogical Seminary and Journal of Genetic Psychology* 73: 175-86; December 1948.

62. Nevers, John E. "Effects of Physiological Age on Motor Achievement." *Research Quarterly of the American Association for Health, Physical Education, and Recreation* 19: 103-10; May 1948.

63. North, Robert D., Jr. "Analysis of the Personality Dimensions of Introversion-Extroversion." *Journal of Personality* 17: 352-67; March 1949.

64. Norvell, George W. *Reading Interests of Young People.* Boston: D. C. Heath and Co., 1950. 262 p.

65. Owens, William A., and Johnson, Wilma W. "Some Measured Personality Traits of Collegiate Underachievers." *Journal of Educational Psychology* 40: 41-46; January 1949.

66. Phillips, E. Lakin. "Intellectual and Personality Factors Associated with Social Class Attitudes Among Junior High School Children." *Pedagogical Seminary and Journal of Genetic Psychology* 77: 61-72; September 1950.

67. Polansky, Norman; Lippitt, Ronald; and Redl, Fritz. "An Investigation of Behavioral Contagion in Groups." *Human Relations* 3: 319-48; 1950.

68. Pratt, Karl C. "Indeterminate Number Concepts: I. Classification and Relation to Determinate Numbers." *Pedagogical Seminary and Journal of Genetic Psychology* 72: 201-19; June 1948.

69. Purdue University. *Problems of High School Youth, Report No. 21, Purdue Opinion Poll for Young People.* Lafayette, Indiana: Purdue University, Division of Educational Reference, 1949.

70. Rabban, Meyer. "Sex-Role Identification in Young Children in Two Diverse Social Groups." *Genetic Psychology Monographs* 42: 81-158; August 1950.

71. Radke, Marian, and Trager, Helen. "Children's Perceptions of the Social Roles of Negroes and Whites." *The Journal of Psychology* 29: 3-33; January 1950.

72. Radke, Marian; Trager, Helen; and Davis, Hadassah. "Social Perceptions and Attitudes of Children." *Genetic Psychology Monographs* 40: 327-447; November 1949.

73. Reymert, Martin L., and Jost, Hudson. "Further Data Concerning the Normal Variability of the Menstrual Cycle During Adolescence and Factors Associated with Age of Menarche." *Child Development* 18: 69-79; December 1947.

74. Reynolds, Earle L., and Schoen, Grace. "Growth Patterns of Identical Triplets from 8 Through 18 Years." *Child Development* 18: 130-51; September 1947.

75. Rose, Annelies A. "Study of Homesickness in College Freshmen." *Journal of Social Psychology* 26: 185-202; November 1947.

76. Sanders, Colsell. "Insecurity and Social Maladjustment in Children." *British Journal of Educational Psychology* 18: 148-55; November 1948.

77. Sheldon, William H., and others. *Varieties of Delinquent Youth: An Introduction to Constitutional Psychiatry.* New York: Harper and Brothers, 1949. 899 p.

78. SKEELS, HAROLD M., and HARMS, IRENE. "Children with Inferior Social Histories: Their Mental Development in Adoptive Homes." *Pedagogical Seminary and Journal of Genetic Psychology* 72: 283-94; June 1948.
79. SKODAK, MARIE. "Mental Growth of Children in the Same Family." *Pedagogical Seminary and Journal of Genetic Psychology* 77: 3-9; September 1950.
80. SKODAK, MARIE, and SKEELS, HAROLD M. "Final Follow-Up Study of One Hundred Adopted Children." *Pedagogical Seminary and Journal of Genetic Psychology* 75: 85-125; September 1949.
81. SKUBIC, ELVERA. "Study in Acquaintanceship and Social Status in Physical Education Classes." *Research Quarterly of the American Association for Health, Physical Education and Recreation* 20: 80-87; May 1949.
82. SPEARMAN, CHARLES, and JONES, L. WYNN. *Human Ability.* London: Macmillan Co., 1950. 198 p.
83. SPIKER, CHARLES C., and IRWIN, ORVIS C. "Relationship Between I. Q. and Indices of Infant Speech Sound Development." *Journal of Speech and Hearing Disorders* 14: 335-43; December 1949.
84. SPITZ, RENE A. "Role of Ecological Factors in Emotional Development in Infancy." *Child Development* 20: 145-55; September 1949.
85. STOUT, IRVING W., and LANGDON, GRACE. "Study of the Home Life of Well-Adjusted Children." *Journal of Educational Sociology* 23: 442-60; April 1950.
86. SWINEFORD, FRANCES. *A Study in Factor Analysis: The Nature of the General, Verbal, and Spatial Bi-Factors.* Chicago: University of Chicago Press, 1948. 70 p.
87. SYNOLDS, DONALD L., and PRONKO, NICHOLAS H. "Exploratory Study of Color Discriminations of Children." *Pedagogical Seminary and Journal of Genetic Psychology* 74: 17-21; March 1949.
88. TERMAN, LEWIS M., and ODEN, MELITA H. *The Gifted Child Grows Up.* Stanford, Calif.: Stanford University Press, 1947. 448 p.
89. THORNDIKE, EDWARD L. "Note on the Shifts of Interests with Age." *Journal of Applied Psychology* 33: 55; February 1949.
90. THORNDIKE, ROBERT L. "Community Factors Related to Intelligence and Achievement of School Children." *Growing Points in Educational Research.* Official Report of 1949 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1949. p. 265-71.
91. THORNDIKE, ROBERT L. "Growth of Intelligence During Adolescence." *Pedagogical Seminary and Journal of Genetic Psychology* 72: 11-15; March 1948.
92. TRAXLER, ARTHUR E. "Sex Differences in the Vocabulary of General and Special Fields in Grades VII to X." *Growing Points in Educational Research.* Official Report of 1949 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1949. p. 146-51.
93. TYSZKOWSKI, W., and LASLETT, HERBERT R. "Some Characteristics of Physically Defective Students." *Educational Administration and Supervision* 34: 347-59; October 1948.
94. VOLBERDING, ELEANOR. "Characteristics of Successful and Unsuccessful Eleven-Year-Old Pupils." *Elementary School Journal* 49: 405-10; March 1949.
95. VOLBERDING, ELEANOR. "Out-of-School Living of Eleven-Year-Old Boys and Girls from Differing Socioeconomic Groups." *Elementary School Journal* 49: 348-53; February 1949.
96. WALL, W. D., and SMITH, EBERLE M. "The Film Choices of Adolescents." *British Journal of Educational Psychology* 19: 121-36; June 1949.
97. WELLS, FREDERIC L. "Psychometric Patterns in Adjustment Problems at Upper Extremes of Test Intelligence: Cases XXIX-LVI." *Pedagogical Seminary and Journal of Genetic Psychology* 76: 3-37; March 1950.
98. WILLIAMS, MELVIN J. "Personal and Familial Problems of High School Youths and Their Bearing Upon Family Education Needs." *Social Forces* 27: 279-85; March 1949.
99. WINKER, JAMES B. "Age Trends and Sex Differences in the Wishes, Identificacation, Activities and Fears of Children." *Child Development* 20: 191-200; December 1949.
100. YARROW, LEON J. "The Effect of Antecedent Frustration on Projective Play." *Psychological Monographs* 62: 1-42; No. 6, 1948.

101. YOUNG, FLORENCE M. "Comparison of the Nervous Habits of Preschool and College Students." *Journal of Personality* 17: 303-309; March 1949.
102. ZAKOLSKI, FRANCIS C. "Studies in Delinquency: Personality Structure of Delinquent Boys." *Pedagogical Seminary and Journal of Genetic Psychology* 74: 109-17; March 1949.
103. ZELIGS, ROSE. "Children's Concepts and Stereotypes of Polish, Irish, Finn, Hungarian, Bulgarian, Dane, Czechoslovakian, Hindu, and Filipino." *Pedagogical Seminary and Journal of Genetic Psychology* 77: 73-83; September 1950.

CHAPTER II

Conditions Affecting the Guidance Program

PHILIP A. BOYER
With the cooperation of MINERVA F. DESING and MARY ALICE LAIRD

MAJOR researches in this area are few, despite a considerable body of literature that represents local practice and current thinking. It has been the reviewer's intent to include such research as was available and such reports as were illustrative of trends or general current practice.

Staff Participation

The success of a program of guidance is related to the interest, ability, and training of the people engaged in the activity. The personal qualities of the counselor, such as ability to achieve rapport, to inspire confidence, and to influence as individuals the thinking and the emotional experiences of young people, must be combined with technical knowledge, insights, attitudes, and skills to guarantee maximum effectiveness and quality in a guidance service (35, 49). Guidance service, according to Douglass (35), may be classified into five levels, each successive level calling for a greater amount of training. Two safeguards must be set up to insure an effective guidance service in a school: (a) teachers must have time to perform the necessary activities and to take part in an inservice training program and (b) teachers must be adequately motivated. Douglass also outlines nine fields of inservice training necessary for a growing program. The three outstanding problems in drawing members of the staff into the field of personnel service are: (a) to obtain wholehearted interest in this field; (b) to see that sufficient members of the staff are adequately trained; and (c) to see that those participating in guidance have sufficient time, adequate library aids, and expert advice in the more important areas in which service is called for. Services and programs of guidance and counseling should be developed only as rapidly and in such ways as are commensurate with the numbers and abilities of the personnel available to implement the program (87).

Personnel Records

Strang (142) summarized four values of cumulative records: (a) showing trends from year to year in reference to each type of growth or activity reported, (b) showing relationship among the items recorded, (c) serving as a starting point for the counselor or teacher in an interview, and (d) providing a basis for curriculum development.

In reference to the use of cumulative records in guidance, Traxler (149) called attention to the trend toward the orderly accumulation and recording of a variety of information concerning each individual. He traced briefly the history of cumulative records and stressed the frequently forgotten or overlooked value of developing new records as a device for staff training. He emphasized the tendency to give increased space to personal qualities and to objective data relative to ability, achievement, and interests. Raab (123) stressed the importance of using records in helping individual children. Twenty advantages of using anecdotal records were listed by Bieker (11). One of the most extensive surveys of the use of cumulative records was reported by Michaelis (102, 103). Approximately 80 percent of the 68 cities replying stated that cumulative records were used. These records varied from cards used only for recording grades to elaborate folders for recording data related to the total development of children. Michaelis recommended the folder as the most promising type.

Elementary- and Secondary-School Enrolments

For several years prior to 1946 elementary-school enrolment had been decreasing. This trend has now changed. The number of live births per 1000 population in the United States increased from 17.1 in 1937 to 21.5 in 1943. Birth rates in the war years, 1944 and 1945, decreased to 20.2 and 19.6 respectively, but increased again to 23.3 in 1946 and 25.9 in 1947 (90, 152). This high birth rate will bring 7,000,000 children into the schools by 1956 (7). The elementary-school enrolment will be 46 percent greater in 1957 than in 1947 (46, 61, 90, 134).

Elliott (37, 38, 39) predicted, on the basis of the factors which he outlined and of other relevant data, that a decline can be expected in the late 1950's in the elementary school, but not before 1965 in the secondary school. Linn (90) estimated that the elementary-school enrolment peak will come in 1958.

Linn (90) reported and interpreted for members of schoolboards the estimates made by the Metropolitan Life Insurance Company of school-age population for the period 1948 to 1960. He pointed out that a study of these data reveals that in 1958 there will be approximately 34,200,000 children between the ages of six and 17 years, or some 6,900,000 more than the 27,300,000 estimated for 1948. However, the number of pupils of high-school age, from 14 to 17 years, will continue to increase after 1958. An estimated total enrolment in the public schools for 1950-51 of 25,730,097 was issued by the NEA Research Division (109) in November 1950.

Studies on a statewide basis surveying present enrolment or predicting future enrolment were reported in bulletins or periodicals for California (20, 31), Illinois (70), Indiana (163), Michigan (69), New York (125, 138), Pennsylvania (119), and Texas (64, 129).

Data on the school enrolment in 135 representative cities of over 10,000 in population for 1947-48 and 1948-49 are included in a report by the Educational Research Service of the National Education Association (110). Figures on enrolment in January 1949 and January 1950 for cities over 2500 in population were given in another publication by the same agency (111).

Colleges and Universities Enrolments

Hoff (65) in 1948 showed a heavy concentration of students in a few colleges and universities. He found that 1,011,564 students, nearly one-half of the total college students, were enrolled in only 288 institutions.

Recktenwald (124) reported a study of 121 veterans, high-school graduates, who chose certain vocational objectives which involved college attendance. He found approximately 50 percent capable of undertaking college work. This is roughly comparable to the figure given by the President's Commission on Higher Education (156).

Williams (166) gave a clear exposition of the discrepancies between the two major reports on enrolment in institutions of higher learning, the U. S. Office of Education term enrolment data published each fall and the Walters report published annually in *School and Society*.

For 30 years, Walters (162) has published his "Statistics of Attendance in American Universities and Colleges." Walters (161) also reported the results of a study of 154 institutions of higher education in 30 states covering the years 1946-1949. The greatest factor in fluctuation in numbers enrolled was the incoming and outgoing tide of veterans. This factor accounted for an increase of 582,017 full-time students in these institutions in 1946 to a peak enrolment of 639,092, followed by a decline to 600,943 in 1949.

The report of Group I of the American Association of Collegiate Registrars and Admission Officers in 1949 (6) outlined the factors affecting enrolment trends in institutions of higher learning and the circumstances under which estimates of enrolment must be modified, and also made predictions of the veteran, nonveteran, and total enrolments with percent of change from previous year.

Jenkins (71, 72, 73) has reported annually for some years the trends in enrolment in Negro institutions of higher learning. McGinnis (94) reported a study of the enrolment of Negro students in Ohio colleges for the school year 1948-49.

Studies were made of college enrolment potential in California (23, 31), Indiana (163), Pennsylvania (118, 119), and Texas (22). Studies of more limited scope were those in the Cleveland area (164) and for the University of Akron, a municipal university (42).

Private and Parochial Schools

Enrolment in nonpublic elementary schools has risen steadily for the past 25 years. Catholic schools account for about 93 percent of these enrolments, according to Sister Rose Marie (128). The largest enrolments ever attained in the Catholic secondary schools and colleges are reported, and further increases are predicted (44, 108).

Holding Power of the Schools

Indications that only 42 percent of the students who were in the fifth grade in 1938-39 graduated from high school in 1946, were presented in a Work Conference on Life Adjustment Education (155). In Hollywood, California, 43 percent of the high-school enrolment dropped out before graduation; in Columbus, Ohio, 31 percent left school; in 76 representative Illinois high schools, the range of drop-outs was from 6 percent in one high school to 80 percent in another, with a median of 30 percent. In the city of New York the drop-out rates for individual schools vary from about 5 percent to about 65 percent. In spite of this dark picture, there is a ray of hope in the fact that the school survival rate, according to Gragg (54), has increased 215 percent in the past 25 years.

Reasons for Dropping Out

The findings of the numerous studies of holding power of our schools which have been reported recently seem to disagree in many respects with those of previous years or with popular impression. In contrast to the emphasis laid upon economic reasons in the earlier studies, the more recent reports have pointed out the relative unimportance now attached to economic reasons by youth who leave school (8, 132, 133). Syracuse youth, who gave school situations as reasons for leaving (136), represented 61 percent of the drop-outs. The Louisville survey (74, 75) also showed that dissatisfaction with school as the occasion for leaving loomed considerably larger than economic reasons. The decision to leave school usually was the result of complex pressures involving educational maladjustment, economic need, desire for independence, and various other factors.

In Dillon's *Early School Leavers* (32), there is close agreement with the results of the Syracuse study. An even larger proportion, 69 percent, indicated that dissatisfaction with school was of first importance in their decision to leave school. Seven symptoms of vulnerability to school-leaving were listed: (a) fairly constant regression in scholarship from elementary school to junior high school and to senior high school, (b) frequent grade failures in the elementary school, (c) high frequency of grade or subject failures in the junior or senior high school, (d) marked regression in attendance from elementary school to junior to senior high school, (e) frequent transfers from one school to another, (f) evidence of a feeling of insecurity or "lack of belonging" in school, and (g) marked lack of interest in schoolwork. Gragg (55) reported a study of drop-outs and graduates in Utica, New York, and New Haven, Connecticut. No one item studied discriminated completely between drop-outs and graduates. Other studies of reasons why pupils quit school were made in Austin, Texas (17, 86), in Camden, New Jersey (18), and in Missoula, Montana (126). Tompkins posed the question of the difference in holding power of the school in regard to sex in "Where Are the Boys?" (147). The U. S. Office of Education (155) reported that Christopher emphasized the lack of "emotional willingness to work" and retardation as factors differentiating between drop-outs and graduates. A somewhat different approach was reported by Dreier and Kreitlow in their study of the plans of rural youth in Minnesota (36).

Studies appeared on the holding power of the public schools of San Francisco (139), Minneapolis (9, 10, 137), Utica (55), and New Haven (55), of Illinois high schools (5, 57), and of a Philadelphia vocational-technical high school (80). The holding power of the school as a factor in enrolment was discussed by Gragg (56) and by Foster (45). Details on how to conduct a holding power study were given by Allen (5) and Gragg (55).

Prevention of Early School Leaving

Under the guidance of the U. S. Office of Education, representatives of the 50 largest cities met in January 1950 to study the problem of drop-outs in public schools. They appraised the problem and developed a suggested program for reducing the high incidence of premature school leavers (155). A similar conference was scheduled for 1951 to develop a uniform accounting and research procedure in order that cities may make simultaneous studies and eventually compare findings and suggested approaches to the problem. Others who have advanced suggestions for reducing school leaving were Holbeck (66), Lambert (85), Martin (98), Swem (144), and Woellner (168).

Recent studies emphasized the need of closer collaboration between administrators and teachers, and of expanding special services. They also reaffirm the need of a professional staff possessed of a greater understanding of the dynamics of individual and group behavior.

Withdrawal from College

Studies dealing with the problem of veteran withdrawal from college were reported by Aaronson (1, 2), and Lipsett and Smith (91). Other studies of withdrawal were reported by Love (92) for evening classes, by Cumings (29) for DePauw University, and by Tyszkowski (150) for physically defective college students. Hewer and Keating (62) reported that business firms hiring salesmen did not penalize college drop-outs.

Attendance

Recent studies have been concerned with basic factors affecting regularity of school attendance. The Metropolitan Life Insurance Company (26, 101, 151) sponsored an extensive investigation of absence in seven cities of California, involving 8000 children, most of whom were under 12 years of age. Eighty-five percent of the children enrolled had some absence during the semester. The total time lost amounted to 76 days per 1000 pupil-days. Eighty-seven percent of the time lost was due to absence for medical reasons. The principal cause of nonmedical absence was trips away from home, accounting for 36 percent. Sixteen percent was due to helping at home, more common among girls than among boys. Parental neglect was responsible for 15 percent of the absence in this group, and truancy for 7 percent.

The Citizens' Committee on Children of New York City (24, 25) approached the problem from the standpoints of socio-economic correlates and of referred cases. The Committee studied the relation of school attendance to age of school building, size of class, type of neighborhood, home rental rate, and ethnic group. Findings were not conclusive except in the case of socio-economic level, where it was found that attendance rates were highest in stable middle-class areas and lowest in slum and transitional neighborhoods.

Mohr (105) studied 40 unlawfully absent pupils who were disturbed. Of the 31 adolescents, only five had been truant before adolescence. All had entered adolescence "emotionally starved," and found difficulty in making the transition from a single teacher to the departmental system. The beginning of truancy could frequently be traced to fear arising from a school situation which threatened to reveal some weakness on the part of the pupil. Nine reading deficiencies were noted, and 15 cases of arithmetic retardation.

Thompson (145) observed an increase in cases of school phobia in good socio-economic areas of New York, in contrast to a very low case rate for Harlem. She studied 32 cases, describing symptoms and indicating methods of treatment. In the developing stage, the phobia is likely to take the form of habitual lateness. Later it becomes chronic absence or extreme panic in school, with such symptoms as nausea, crying, dizziness, or vomiting. There is usually a precipitating incident such as removal to a new neighborhood or school, a new teacher, or a scolding or other "attack." Twenty-three of the cases studied were average or higher in intelligence, but 30 were retarded in arithmetic, reading, or both. The most constant factor was found to be the personality of the parents. For the most part, the mothers are characterized as overanxious, oversolicitous, domineering, immature, and narcissistic, whereas the fathers are likely to be gentle, kindly men dominated by their wives.

Mullen (107) investigated truancy in relation to disorderly conduct in the classroom. The 1628 truancy or disciplinary cases in the study were divided into preadolescent and adolescent groups. More home problems, particularly among adolescent groups, were found for truants than for disciplinary cases. Lack of self-confidence and inadequate recreational facilities were especially noted for the truant group. The discipline group was found to have greater retardation. Truancy increased with age, whereas the incidence of discipline cases decreased. Intelligence did not differentiate the groups. All groups had many physical handicaps, erratic school history, social and family problems, poor personal adjustment, and serious educational retardation, particularly in drill subjects. Wiens (165) also found serious retardation in pupils studied by the attendance service in Cleveland, and pointed out their need for curriculum adjustment and for sympathetic teachers.

Progress Thru School

Failure

Failure studies for the decade 1935-1945 were reviewed by Lafferty (84). Comparing the causes of failure as stated by teachers and pupils, he found close agreement with studies of the preceding decade. Teachers continue to attribute failure to pupil factors, and pupils still lay the cause of failure upon the teacher.

Studying educational progress at the college level, Gerard (51) found growth in certain areas after completion of pertinent courses, and even when a course was not taken. With respect to "passing" courses, he observes that tests of a general nature indicate that students differ widely in the level at which they begin and complete a course.

Promotion

Over recent years there has been a strong trend toward annual promotion (112), particularly in New England and the Northwest. This is particularly true in the smaller districts, where administrative convenience may weigh heavily. Annual promotion is reported most frequently at the elementary level and least frequently for the senior high school. In Waco, Texas (15), before the introduction of annual promotion, the failure rate in Grade I was 22 percent for the first term and 16 percent for the second term. After the change to annual promotion, the failure rate in Grade I dropped to 16 percent for the year. For the entire elementary level, failure was reduced 5.8 percent for each term to 4.0 percent for the year.

Dodes (33) reported an experiment with annual promotion in a four-year high school in the city of New York in an effort to reduce the high rate of failure at the middle of the tenth grade. All students were taught by the same teacher thruout the year. In five semesters this plan appeared to have eliminated 474 failures which would normally have occurred in the first term of Grade X by providing a longer adjustment period and relieving tension so that pupils were able to make up their deficiencies by the end of the year.

There is a trend toward a policy of "no failure," commonly referred to as "automatic promotion" (88, 112). Such policies were reported by 17 percent of school districts, particularly in the Far West and in large cities (112). Districts reporting "no failure" policies tend to expand rather than to curtail the practice. Parental approval is indicated in the majority of districts studied by the Milwaukee Teachers' Association (88).

A popular attempt to overcome the evils of pupil failure was the elimination of grade lines (48, 77, 112, 160). This practice was reported for one or more schools in 17 percent of school districts (112). A number of districts have experimented with plans for continuous progress. Richmond, Indiana (160), divided pupils into three broad levels, kindergarten, primary grades, and the intermediate grades. Classes were subdivided into small flexible groups which shift constantly. South Plainfield, New Jersey (48), has operated an elementary school in which pupils are grouped by age, physical development, and social adjustment. They progress in groups of two or three whenever ready, but such adjustments are never made at the end of the year. A novel feature of the plan consists in sending birthday cards to all five-year-olds in the district with an invitation to come to kindergarten on the first of the following month. The Milwaukee experiment with continuous progress at the primary level, begun in 1942, has expanded to include 40 schools (43). Particular care was taken to orient both teachers and parents before inaugurating the program in each school.

Acceleration

Dohan (34) reported an accelerated program in which able students, remaining within the regular class organization, were able to do three semesters' work in two semesters. The absence of maladjustment problems she attributed to the fact that the accelerated pupils progressed in a group, thus avoiding such problems as might arise when an individual pupil is placed in an older group. An accelerated program at a university high school is described by Kreps and Maurer (83).

Pressey (120) reported an extensive research on acceleration at the college level undertaken at Ohio State University in 1942. He emphasized the social danger of the "lock-step" system which keeps young people in college at the age when they should be beginning their careers and playing their roles in the adult world. Accelerated students were found to do better work in less time than their fellow students. Acceleration of carefully selected individuals did not cause maladjustment (100). Van Der Jagt and Angell (157) presented evidence that accelerated students do better in botany and zoology courses than nonaccelerated students of similar mental ability and initial achievement.

Exceptional Children

A considerable volume of literature on the exceptional child has appeared in publications of the past few years. It has dealt principally with the physically handicapped. For the most part, current practice is described, altho increasing attention has been accorded to the emotional needs and personality aspects of exceptional children.

Extent of Special Provisions

The number of school systems making some special provision for the exceptional child doubled from the year 1940 to the biennium 1946-1948. The number of children served increased 20 percent (154). The total enrolment in public day and residential classes for exceptional children was 441,820. This represents approximately 11 percent of the estimated number of children needing special provision. The increased enrolments have resulted from extended provision for speech defectives, the home-bound and hospitalized, the socially maladjusted, the gifted children, and the exceptional child at the secondary-school level. Enrolments decreased for mental and visual defectives and for delicate children. The status of services for the home-bound was presented by the U. S. Office of Education (153). Ellis (40) reported a trend toward greater attention to physical and medical needs of handicapped children, and noted increased concern with cerebral palsy. In a survey of services for exceptional children in Pennsylvania, English (41) reported that 77 percent of the districts with district superintendents provided instruction for home-bound children.

A severe limitation to the expansion of services in this area is the shortage of teachers. Orleans (115) presented data on the number, certification requirements, and salaries of teachers of the handicapped for 18 large cities, observing that the customary small salary differentials are not adequate.

Martens (96, 97) analyzed the legal basis for the education of exceptional children and advanced 10 basic principles that should be observed. Tho nearly every state makes some legal provision for exceptional children, only Florida, Illinois, Iowa, and New York have a sufficient legal foundation for the establishment and financing of a complete program involving physical, mental, and emotional deviates. Recent legislation (97) revealed an interest in the preschool handicapped child, and appropriations indicate a willingness to meet the increased costs of special education.

Visually Handicapped

Buell (19) studied gross motor performance of 865 partially sighted and blind children in various track and field activities. He found their performance poorer than that of sighted pupils, but observed such improvement as would indicate the desirability of a track and field program for these children.

Hard of Hearing

Evidence that the hard-of-hearing child has a slower rate of school progress than the normal child was reported by Sprunt (140), who studied

692 children. Pugh (121) observed that the acoustically handicapped child is capable of becoming a good reader. He found some excellent readers among deaf children, altho the reading level for the group was quite low. Oleron (114) found deaf children markedly inferior to normal children in intelligence as tested by Raven's *Progressive Matrices*. Those whose deafness was of recent origin were superior to those who had been deaf from birth or early years.

Crippled

Cruikshank and Dolphin (27) studied the emotional needs of crippled children. They found the need for love and affection was overmet for both boys and girls, particularly in Grades VII to XII. More opportunity to make their own decisions was needed by these children. Postpoliomyelitis cases studied by Seidenfeld (135) showed psychosomatic effects indicating a need for security, and reflected the emotional attitudes of parents and community and the overlimitation of activities. The social relationships within a group of 20 crippled children were investigated in a preliminary study by Cruikshank and Medve (28) using the "guess who" technic.

Delinquent

Glueck and Glueck (52) made an unusually thoro comparison of 500 delinquent boys in state correctional schools with a nondelinquent group matched on age, intelligence, ethno-racial origin, and residence in underprivileged neighborhoods. Delinquents were found to be of the muscular, solid type. They tend to express themselves in a direct, immediate, concrete manner. They tend to show a higher degree of ability on the performance items of intelligence tests and a lower ability on the verbal items. Delinquents are generally extroversive, vivacious, impulsive, hostile, resentful, defiant, suspicious, and destructive. They have less self-control, less fear of failure, and are less concerned about convention than are nondelinquents. They are less submissive to authority, more socially assertive, and tend to feel that they are not appreciated. Their school achievement is inferior and their behavior characterized by lack of interest, tardiness, laziness, carelessness, truancy, disobedience, impertinence, and a stubborn, sullen attitude. Many of the personal traits of delinquents are those which, under happier circumstances, might produce the pioneer. Having generally described the delinquent, the authors indicated that the next step is to discover why some children with traits characteristic of delinquents are nondelinquent, and vice versa.

Zakolski (169) found 23 traits which characterize delinquent boys and an equal number which do not. As compared with nondelinquent boys, he found the delinquent to be less intelligent, to have less of certain mechanical and clerical abilities, and to be inferior in health, social adjustment, school abilities, and family and community relations. He presents an "initial psychological inadequacy plus the development of a new, socially unacceptable, adjustive reaction." Studying 25 delinquents with court records in comparison with a group of nondelinquents, Birkeness and Johnson (14) found inferior school achievement and creativeness and more grade repetitions among the delinquents. They also had less influence over their associates, more socially unacceptable traits, and felt less secure in their social relationships. They were less stable emotionally, less interested in their own welfare and demonstrated less purpose, decisiveness, and persistence.

Mentally Retarded

Provisions for children with IQ's below 50 were surveyed by Parsons (117). These children are commonly exempted from school attendance. Only St. Paul, Minnesota, among the 23 school systems surveyed, provides specifically for these children. It has three special classes enrolling these low IQ pupils from five to 21 years of age. Attendance is voluntary, and all pupils are transported.

Hollinshead (67) described a technic successful in the placement of mentally retarded boys and girls in the secondary school. Thorne (146) reported a program of counseling for mental defectives in a state institution with resulting improvement in institutional morale and in the individual welfare of the children.

Hill (63) retested 107 children with IQ's between 50 and 81 after varying periods of special-class instruction and found "little support to a thesis of IQ improvement insofar as the effects of adequate schooling upon subnormal and borderline children are concerned."

There is considerable interest in glutamic acid therapy for the mentally retarded. Zimmerman and Burgemeister (170), and Zimmerman, Burgemeister, and Putnam (171) found average gains of 10 months in mental age during six months of glutamic acid therapy. An added six months yielded less return. The gains persisted well, being most stable for cases having the full year of treatment and for those who had gained most. Quinn and Durling (122), Waelsch (158, 159), Sister Maureen (99), and Levine (89) indicated improvement following glutamic acid treatment, whereas McCulloch (93) and Kerr and Szurek (78) found no evidence of improvement. Levine's (89) subjects were deaf. She noted greater alertness and responsiveness to environment, and in one case marked improvement in physical appearance.

Gifted

Wilson (167) surveyed by questionnaire the educational provisions for gifted children. Sixty-one percent of the respondents reported special provision for the bright child thru special classes, limited acceleration, or enrichment. There was considerable interest in the socialization of the gifted and in their individual needs.

Vocational Possibilities for the Handicapped

Kossoris (82) studied industrial workers with serious physical handicaps, comparing them with matched nonhandicapped cases. He found the handicapped in 1500 types of job. The rate of output of the handicapped averaged 1 percent better than that of the nonhandicapped, falling below that of the control group in only 27 percent of the cases. Absence was greater among the handicapped by one day per year. The rate of injury was lower for the handicapped, and the type of injury depended on the job rather than on the type of physical handicap. McIntosh (95) followed up 1000 graduates of a trade school for "nonacademic" boys who had been out of school from one to 10 years. The importance of personal characteristics for vocational success was stressed by Michal-Smith (104).

Johnson (76) reviewed studies on guidance for the mentally handicapped and indicated the present status of findings. He observed that without guidance the mentally retarded have goals beyond the possibility of achievement, and stressed the need for integrated guidance training from early years thru the process of job adjustment.

Methods, Materials, and Facilities

Methods, materials, and facilities for the various types of exceptional children are discussed at length in a yearbook of the National Society for the Study of Education (113).

Several articles (12, 58, 59, 60) describe or review tests for use with the visually handicapped. Cummings (30) reviewed research on mechanical means of printing braille and producing Talking Books. Rusalem (130) surveyed guidance practices in schools for the blind.

Kirk and Perry (79) compared the Ontario and Nebraska tests for measuring the intelligence of deaf children. A new group hearing device was described and experimentally evaluated by Hudgins (68). Pugh's (121) study provided data for compiling deaf norms on two widely used reading tests. Adelson (3) described materials and equipment available for the education of deaf preschool children.

The effectiveness of psychological tests for determining and interpreting the needs of the speech handicapped was discussed by Stinchfield-Hawk (141). Two new devices for visible speech, the sound spectograph and the cathode ray translator, were described by Kopp and Green (81). Breckwoldt (16) described the use of the artificial palate. The trend to the recognition of five stages of treatment for stuttering was presented by Ainsworth (4).

Cassel (21) presented an adaptation of the Oseretsky test of motor maturation for American use. Rimoldi (127) described and discussed Raven's *Progressive Matrices Test,* and its use with the cerebral palsied was discussed by Tracht (148). Schoenbohm (131) and Gauerke (50) discuss the planning of school buildings for crippled children.

Birch (13) validated the Goodenough test for older mental defectives, finding it satisfactory for use with children with IQ's of 70 or below. French (47) used remedial reading technics devised for use with normal children who have patterns of associational deficiencies with three mentally retarded children who had these deficiencies, and found promising results.

Mensh (100) studied the use of the Rorschach test with gifted children, observing the necessity for considering both quality and quantity of response, for considering age and sex, and for basing evaluations on norms for varying age and IQ.

A two-way telephone technic for use with the home-bound was described by Parker and Winterstein (116).

The materials and methods of diagnosis and treatment of the brain-injured child were extensively presented by Strauss and Lehtinen (143).

Bibliography

1. Aaronson, Bernard S. "Factors Influencing Veterans To Leave School." *Journal of Higher Education* 21: 96-97; February 1950.
2. Aaronson, Bernard S. "Lack of Money and the Veteran's Withdrawal from School." *School and Society* 69: 28-31; January 8, 1949.
3. Adelson, Leone, and others. "A New Approach to the Education of Two and Three Year Old Deaf Children." *Volta Review* 51: 205-208, 273-75; May and June 1949.
4. Ainsworth, Stanley. "Present Trends in the Treatment of Stuttering." *Journal of Exceptional Children* 16: 41-44; November 1949.
5. Allen, Charles M. *How To Conduct the Holding Power Study.* Circular Series A, No. 51, Illinois Secondary School Curriculum Program Bulletin No. 3. Springfield: State Department of Public Instruction, May 1949. 128 p.
6. American Association of Collegiate Registrars and Admission Officers. "Report of Group I of Convention in Columbus, Ohio, April 1949." *College and University* 24: 566-68; July 1949.
7. American Teacher. "School Enrollment Expected To Pass 32,000,000." *American Teacher* 34: 16; January 1950.
8. American Teacher. "Why Boys and Girls Leave School." *American Teacher* 33: 20; April 1949.
9. Andrews, Margaret E. *High School Graduates as of April 1946.* Minneapolis: Board of Education, July 2, 1947. 11 p.
10. Andrews, Margaret E. *Summer Drop-outs Continue Decline in 1949.* Minneapolis: Board of Education, November 8, 1945. 7 p.
11. Bieker, Helen. "Using Anecdotal Records To Know the Child." *Fostering Mental Health in Our Schools.* 1950 Yearbook. Washington, D. C.: Association for Supervision and Curriculum Development, a department of the National Education Association, 1950. p. 184-202.
12. Bigman, Gertrude T. "A Clerical Test for the Visually Handicapped." *Outlook for the Blind* 44: 80-83; March 1950.
13. Birch, Jack W. "The Goodenough Drawing Test and Older Mentally Retarded Children." *American Journal of Mental Deficiency* 54: 218-24; October 1949.

14. Birkeness, Valborg, and Johnson, Harry C. "A Comparative Study of Delinquent and Non-Delinquent Adolescents." *Journal of Educational Research* 42: 561-72; April 1949.
15. Brandon, Bertha M. "How Waco, Texas, Changed to Annual Promotion." *Nation's Schools* 45: 72-73; March 1950.
16. Breckwoldt, Gerhart H. "The Use of the Artificial Palate for Visual Control and Improvement of Articulation." *Volta Review* 50: 301-303; July 1948.
17. Brewer, Weldon. "Why Do Students Quit?" *Texas Outlook* 34: 8-9; August 1950.
18. Brown, Howard W. "Why They Leave School." *Education Digest* 15: 40-41; February 1950.
19. Buell, Charles. "Motor Performance of Visually Handicapped Children." *Outlook for the Blind* 44: 256-58; November 1950.
20. California Department of Education, Bureau of Educational Research. "Enrollment in California Public Schools, March 31, 1948." *California Schools* 19: 181-95; June 1948.
21. Cassel, Robert H. "The Vineland Adaptation of the Oseretsky Tests." *The Training School Bulletin* 46: 1-32; May 1949.
22. Chambers, Robert W. "1950 College Boom." *Texas Outlook* 34: 15; September 1950.
23. Chretien, C. Douglas. "Registration Data for California Institutions of Collegiate Grade, Fall, 1947." *California Schools* 19: 121-25; May 1948.
24. Citizens' Committee on Children of New York City. *Children Absent from School.* New York: the Committee (136 E. 57th Street), 1949. 116 p.
25. Citizens' Committee on Children of New York City. "Truancy and Children's Problems." *Understanding the Child* 19: 40-47; April 1950.
26. Craig, Marjorie L. "Absenteeism in the School Health Program." *Journal of the American Association for Health, Physical Education, and Recreation* 20: 628-29; December 1949.
27. Cruikshank, William M., and Dolphin, Jane E. "A Study of the Emotional Needs of Crippled Children." *Journal of Educational Psychology* 40: 295-305; May 1949.
28. Cruikshank, William M., and Medve, Julia. "Social Relationships of Physically Handicapped Children." *Journal of Exceptional Children* 14: 100-106; January 1948.
29. Cumings, Edgar C. "Cause of Student Withdrawal at DePauw University." *School and Society* 70: 152-53; September 3, 1949.
30. Cumings, Francis J. "The American Foundation for the Blind and Technical Research." *Outlook for the Blind* 42: 188-92; June 1948.
31. Deutsch, Monroe E.; Douglass, Aubray A.; and Strayer, George D. *A Report of a Survey of the Needs of California in Higher Education.* Berkeley: Committee on the Conduct of the Study Appointed by the Liaison Committee of the Board of Regents of the University of California and the California State Board of Education, March 1, 1948.
32. Dillon, Harold J. *Early School Leavers.* New York: National Child Labor Committee, 1949. 94 p.
33. Dodes, Irving Allen. "The Stuyvesant Tenth-Year Promotion Plan." *High Points* 31: 27-34; February 1949.
34. Dohan, Mary Helen. "The Accelerated Elementary Program at Ursuline Academy, New Orleans." *Catholic Educational Review* 46: 431-35; September 1948.
35. Douglass, Harl R. "Developing Staff Participation in Personnel Work." *Bulletin of the National Association of Secondary-School Principals* 32: 84-90; March 1948.
36. Dreier, William H., and Kreitlow, Burton W. "Educational Plans of Minnesota Rural Youth." *Journal of Educational Sociology* 23: 33-41; September 1949.
37. Elliott, Lloyd H. "Another Inventory of School Enrollment and Teacher Needs." *School and Society* 68: 373-75; November 27, 1948.
38. Elliott, Lloyd H. *Effects of Birth Rate on Public School Enrollment and the Need for Teachers, 1948-1960.* Doctor's thesis. Boulder, Colo.: University of Colorado, 1948. (Typewritten)

39. ELLIOTT, LLOYD H. "Estimating Future Enrollment." *Nation's Schools* 42: 27-28; November 1948.
40. ELLIS, VIVIAN. "Some Changing Concepts in the Education of Physically Handicapped Children." *Journal of School Health* 18: 241-47; November 1948.
41. ENGLISH, ORLANDO H. *A Survey of the Educational Services Available for the Boys and Girls of Pennsylvania in School Districts Administered by District Superintendents.* A Conference Report of Pennsylvania Association of District Superintendents. Altoona: the Conference, November 17, 1949. 10 p. (Mimeo.)
42. EVANS, HOWARD R. "Prediction of Enrollment in a Municipal University." *Journal of Higher Education* 19: 369-71; October 1948.
43. FAITH, EMIL F. "Continuous Progress at the Primary Level." *Phi Delta Kappan* 30: 356-59; May 1949.
44. FARRELL, REV. ALLEN P. "Enrollment in Catholic Institutions." *Higher Education* 4: 219; May 15, 1948.
45. FOSTER, EMERY M. "Children Not in School." *American School Board Journal* 120: 36; April 1950.
46. FOSTER, EMERY M. "Magnitude of the Nation's Educational Task Today and in the Years Ahead." *School Life* 32: 88-89; March 1950.
47. FRENCH, EDWARD L. "Reading Disability and Mental Deficiency: A Preliminary Report." *Training School Bulletin* 47: 47-57; May 1950.
48. FRIES, HARRY C. "A Continuous Progress School." *American School Board Journal* 119: 52; July 1949.
49. FROELICH, CLIFFORD PAYO. *Guidance Services in Smaller Schools.* New York: McGraw-Hill Book Co., 1950. 352 p.
50. GAUERKE, WARREN. "When You Build That School for the Handicapped." *Crippled Child* 26: 12-13; December 1948.
51. GERARD, RALPH W. "A Study of Educational Progress." *Journal of Higher Education* 19: 21-32; January 1948.
52. GLUECK, SHELDON, and GLUECK, ELEANOR. *Unraveling Juvenile Delinquency.* Harvard Law School Studies in Criminology. New York: Commonwealth Fund, 1950. 399 p.
53. GOLDTHORPE, J. HAROLD. "Estimate of Future College and University Enrollments." *Higher Education* 4: 157-59; March 15, 1948.
54. GRAGG, WILLIAM L. "Holding Power Versus Absorbing Power." *Educational Forum* 14: 295-97; March 1950.
55. GRAGG, WILLIAM L. "Some Factors Which Distinguish Drop-outs from High School Graduates." *Occupations* 27: 457-59; April 1949.
56. GRAGG, WILLIAM L. "Utilization of Census Data in Statistical Analysis of School Drop-out Problems." *Journal of Experimental Education* 18: 147-51; December 1949.
57. HAND, HAROLD C. *Principal Findings of the 1947-1948 Basic Studies of the Illinois Curriculum Program.* Circular Series A, No. 51, Illinois Secondary School Curriculum Bulletin No. 2. Springfield: State Department of Public Instruction, May 1949. 77 p.
58. HAYES, SAMUEL P. "A Historical Review of Achievement Tests for the Blind." *Outlook for the Blind* 42: 300-305; December 1948.
59. HAYES, SAMUEL P. "An Interest Inventory for the Educational and Vocational Guidance of the Blind." *Outlook for the Blind* 42: 95-104; April 1948.
60. HAYES, SAMUEL P. "What Mental Tests Shall We Use?" *Outlook for the Blind* 43: 271-79, December 1949; 44: 91-102; April 1950.
61. HECHT, GEORGE J. "Our Desperate Need for More Schools." *Parents' Magazine* 23: 40-41, 152-53; September 1948.
62. HEWER, VIVIAN H., and KEATING, ELIZABETH A. "Do Firms Hire College Drop-outs as Salesmen?" *Occupations* 28: 32-34; October 1949.
63. HILL, ARTHUR S. "Does Special Education Result in Improved Intelligence for the Slow Learner " *Journal of Exceptional Children* 14: 207-13; April 1948.
64. HITT, J. WARREN. "Trends in Texas Schools." *Texas Outlook* 34: 24; April 1950.
65. HOFF, CHARLES. "Trends of Enrollment, Fees, and Salaries in 288 Colleges." *School and Society* 68: 214; September 25, 1948.
66. HOLBECK, ELMER S. "Seven Ways To Help Prevent Drop-outs." *Nation's Schools* 45: 35-36; May 1950.

67. HOLLINSHEAD, MERRILL T. "Selective Techniques Used in Placement of Mentally Retarded Boys and Girls in the Secondary School." *American Journal of Mental Deficiency* 53: 563-67; April 1949.
68. HUDGINS, CLARENCE V. "A Method of Appraising the Speech of the Deaf." *Volta Review* 51: 597-601; December 1949.
69. HUGGETT, ALBERT J., and RICHARDSON, EUGENE. "Elementary Teacher Demand in Michigan." *School and Society* 68: 44-47; July 17, 1948.
70. ILLINOIS CHAMBER OF COMMERCE. "The Birth Rate and School Enrollment in Illinois." *School and Society* 70: 172; September 10, 1949.
71. JENKINS, MARTIN D. "Enrollment in Institutions of Higher Education of Negroes, 1947-1948." *Journal of Negro Education* 17: 206-15; Spring 1948.
72. JENKINS, MARTIN D. "Enrollment in Institutions of Higher Education of Negroes, 1948-1949." *Journal of Negro Education* 18: 568-75; Fall 1949.
73. JENKINS, MARTIN D. "Enrollment in Institutions of Higher Education of Negroes, 1949-1950." *Journal of Negro Education* 19: 197-208; Spring 1950.
74. JOHNSON, ELIZABETH S. *Hunting a Career—A Study of Out-of-School Youth in Louisville, Kentucky.* U. S. Department of Labor, Bulletin 115. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 117 p.
75. JOHNSON, ELIZABETH S., and LEGG, CAROLINE E. "Why Young People Leave School." *Bulletin of the National Association of Secondary-School Principals* 32: 14-24; November 1948.
76. JOHNSON, G. ORVILLE. "Guidance for the Mentally Handicapped." *Journal of Exceptional Children* 16: 102-108; January 1950.
77. KELLEY, FLORENCE C. "Doing Away with Grade Levels." *Journal of the National Education Association* 37: 222-23; April 1948.
78. KERR, WILLIAM J., and SZUREK, S. A. "Effect of Glutamic Acid on Mental Functions; A Pilot Study." *Pediatrics* 5: 645-48; April 1950.
79. KIRK, SAMUEL A., and PERRY, JUNE. "A Comparative Study of the Ontario and Nebraska Tests for the Deaf." *American Annals of the Deaf* 93: 315-23; September 1948.
80. KOHL, ERNEST O. *Influences Contributing to the Adjustment and Retention of Pupils in the Edward Bok Vocational-Technical School.* Doctor's thesis. Philadelphia: University of Pennsylvania, August 1949. 79 p.
81. KOPP, GEORGE A., and GREEN, HARRIET C. "Visible Speech." *Volta Review* 50: 264; June 1948.
82. KOSSORIS, MAX D. "Impaired Workers in Industry." *Journal of Exceptional Children* 17: 44-47; November 1950.
83. KREPS, RALPH E., and MAURER, CHARLES L. "Accelerated Program of a University High School." *Educational Administration and Supervision* 36: 91-99; February 1950.
84. LAFFERTY, HARRY M. "Reasons for Pupil Failure—A Progress Report." *American School Board Journal* 117: 18-20; July 1948.
85. LAMBERT, SAM M. "Increasing Education's Holding Power, a Progress Report on the West Virginia Education Association's Three-Year Study of Why 65% of the Mountain States' Boys and Girls Are Failing to Finish High School." *Journal of the National Education Association* 39: 664-66; December 1950.
86. LANIER, J. ARMAND. "Guidance-faculty Study of Student Withdrawals." *Journal of Educational Research* 43: 205-12; November 1949.
87. LEFEVER, DAVID WELTY; TURRELL, ARCHIE M.; and WEITZEL, HENRY I. *Principles and Techniques of Guidance.* Revised edition. New York: Ronald Press Co., 1950. 577 p.
88. LEOPOLD, MOLLIE; PORCHEP, FRANCES; and GROSSKOPF, MILDRED. "Milwaukee Teachers' Association Conducts a Study of Promotion Practices." *Milwaukee Teachers' Association Bulletin.* Milwaukee: the Association, September-October 1948. p. 14-22.
89. LEVINE, EDNA SIMON. "Can We Speed Up the Slow Child?" *Volta Review* 51: 269-70; June 1949.
90. LINN, HENRY H. "Our Billion Dollar Babies." *American School Board Journal* 16: 23-24; June 1948.
91. LIPSETT, LAURENCE, and SMITH, LEO F. "Veterans Carry Through on Operation Education." *Journal of Educational Research* 42: 395-97; January 1949.

92. LOVE, ROBERT A. "Call for Action." *School and Society* 70: 227-31; October 8, 1949.

93. MCCULLOCH, THOMAS. "The Effect of Glutamic Acid Feeding on Cognitive Abilities of Institutionalized Mental Defectives." *American Journal of Mental Deficiency* 55: 117-22; July 1950.

94. MCGINNIS, FREDERICK A. "Negro Students in Ohio Colleges, School Year 1948-1949." *Journal of Negro Education* 19: 209-10; Spring 1950.

95. MCINTOSH, W. JOHN. "Follow-Up Study of One Thousand Non-Academic Boys." *Journal of Exceptional Children* 15: 166-70; March 1949.

96. MARTENS, ELISE H. *State Legislation for Education of Exceptional Children.* U. S. Office of Education, Federal Security Agency, Bulletin 1949, No. 2. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 62 p.

97. MARTENS, ELISE H. "State Legislatures and Exceptional Children in 1949." *Journal of Exceptional Children* 16: 161-64; March 1950.

98. MARTIN, ARTHUR G. "Reducing Drop-outs." *Occupations* 28: 536-37; May 1950.

99. MAUREEN, SISTER. *Some Psychological and Physical Characteristics of Retarded Children—Before and Following Treatment with Glutamic Acid.* Doctor's thesis. Washington, D. C.: Catholic University, 1949. (Typewritten)

100. MENSH, IVAN NORMAN. "Rorschach Study of the Gifted Child—A Survey of the Literature." *Journal of Exceptional Children* 17: 8-14; October 1950.

101. METROPOLITAN LIFE INSURANCE COMPANY. *Absent from School Today.* New York: the Company. 14 p.

102. MICHAELIS, JOHN U. "Current Practices in Evaluation in City-School Systems." *Educational and Psychological Measurement* 9: 15-22; Spring 1949.

103. MICHAELIS, JOHN U. "Current Practices in Evaluation in City-School Systems in California." *Journal of Educational Research* 43: 250-60; December 1949.

104. MICHAL-SMITH, HAROLD. "A Study of the Personal Characteristics Desirable for the Vocational Success of the Mentally Deficient." *American Journal of Mental Deficiency* 55: 139-43; July 1950.

105. MOHR, IRMA E. "Fear in Relation to Attendance: A Study of Truancy." *Bulletin of the National Association of School Social Workers* 24: 15-25; September 1948.

106. MORNEWECK, CARL D. "Public School and College Enrollments for the Next Two Decades with Necessary Educational Provisions." *Growing Points in Educational Research.* Official Report of the 1949 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1949. p. 279-85.

107. MULLEN, FRANCES A. "Truancy and Classroom Disorder as Symptoms of Personality Problems." *Journal of Educational Psychology* 41: 97-109; February 1950.

108. NATIONAL CATHOLIC WELFARE CONFERENCE, EDUCATION DEPARTMENT. "600,000 Enrollment Increase in Catholic Schools Due by '57-'58 Peak, Survey Shows." *Catholic Educational Review* 48: 491-94; September 1950.

109. NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION. *Advance Estimates of Public Elementary and Secondary Schools for the School Year 1950-1951.* Washington, D. C.: the Association, November 1950. 18 p. (Mimeo.)

110. NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION, and AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *Enrollment, Professional Staff, and Expenditures in 135 School Systems, 1947-1948 and 1948-1949.* Educational Research Service Circular No. 11, 1948. Washington, D. C.: the Association, 1948. 34 p. (Offset)

111. NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION. *Pupils, Teachers, and School Building Needs in City-School Systems in January, 1950.* Washington, D. C.: the Association, May 1950. 11 p. (Mimeo.)

112. NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION. "Trends in City School Organization, 1938 to 1948." *Research Bulletin* 27: 1-39; February 1949.

113. NATIONAL SOCIETY FOR THE STUDY OF EDUCATION. *The Education of Exceptional Children.* Forty-ninth Yearbook, Part II. Chicago: University of Chicago Press, 1950. 350 p.

114. OLERON, P. "A Study of Intelligence of the Deaf." *American Annals of the Deaf* 95: 179-95; March 1950.

115. ORLEANS, JACOB S. *Practices and Problems in Recruiting Teachers of the Handicapped in Large Cities.* Research Publication No. 2, 1949. New York: College of the City of New York, Committee of Coordination and Teacher Education, 1949. 12 p. (Mimeo.)
116. PARKER, JESSIE M., and WINTERSTEIN, W. A. "School Goes to the Child." *Crippled Child* 27: 26-27; October 1949.
117. PARSONS, ROSA F. *A Study of Public School Facilities for Children of Less than 50 I.Q.* San Diego: Board of Education, February 1949. 3 p. (Mimeo.)
118. PENNSYLVANIA JOINT STATE GOVERNMENT COMMISSION. "Findings and Recommendations on Post-High School Education." *A Report to the Governor and the General Assembly of the Commonwealth of Pennsylvania from the Joint State Government Commission.* Harrisburg: the Commission, 1948. p. 16, 24.
119. PENNSYLVANIA DEPARTMENT OF PUBLIC INSTRUCTION, RESEARCH SERVICE IN EDUCATION. *School and College Enrollment in Pennsylvania—A Look Toward the Future.* Bulletin 75, No. 22, 1948. Harrisburg: the Department, 1948. 31 p.
120. PRESSEY, SIDNEY L. *Educational Acceleration.* Monograph No. 31, 1949. Columbus: Ohio State University, Bureau of Educational Research, 1949. 153 p.
121. PUGH, GLADYS S. "Appraisal of the Silent Reading Abilities of Acoustically Handicapped Children." *Journal of Exceptional Children* 15: 10-14; October 1948.
122. QUINN, KARL V., and DURLING, DOROTHY. "Twelve Months' Study of Glutamic Acid Therapy in Different Clinical Types in an Institution of the Mentally Deficient." *American Journal of Mental Deficiency* 54: 321-32; January 1950.
123. RAAB, GEORGE E. *Ways of Acquiring, Organizing, and Interpreting Information about Specific Children.* Doctor's thesis. Philadelphia: University of Pennsylvania, 1949. 214 p.
124. RECKTENWALD, LESTER N. "Feasibility of Extending Higher Education." *School and Society* 70: 184-86; September 17, 1949.
125. REUSSWIG, THEODORE F. "All the Children of All the People." *New York State Education* 37: 188-89; December 1949.
126. RIMEL, EVELYN G. "Are We Conserving Our Teen-Age Resources?" *Journal of National Association of Deans of Women* 13: 59-62; January 1950.
127. RIMOLDI, HORACIO J. A. "A Note on Raven's Progressive Matrices Test." *Educational and Psychological Measurement* 8: 347-52; Autumn 1948.
128. ROSE MARIE, SISTER. "Rising Enrollments in Non-Public Schools." *School Life* 32: 116; May 1950.
129. ROSENQUIST, CARL M. "Migration from Texas." *Texas Outlook* 32: 26; September 1948.
130. RUSALEM, HERBERT. "A Survey of Group Guidance Practices in Schools for the Blind." *Outlook for the Blind* 42: 305-309; December 1948.
131. SCHOENBOHM, WILKO B. "Planning a Dormitory School for Severely Crippled Children." *Journal of Exceptional Children* 15: 74-76; December 1948.
132. SCHOOL LIFE. "Why Do Boys and Girls Drop Out of School and What Can We Do About It?" *School Life* 32: 136-37; June 1950.
133. SCHOOL MANAGEMENT. "Why Do They Leave School Early?" *School Management* 19: 17; April 1950.
134. SHANNER, WILLIAM M. "Here Come More Kids!" *Elementary School Journal* 49: 425-26; April 1949.
135. SEIDENFELD, MORTON A. "The Psychological Sequelae of Poliomyelitis in Children." *Nervous Child* 7: 14-28; January 1948.
136. SMITH, HARRY P. *Syracuse Youth Who Did Not Graduate.* Syracuse, N. Y.: Board of Education, 1950. 61 p.
137. SNYDER, EVE. *The Boys and Girls Who Finished the Eighth Grade at Seward, in 1944.* Minneapolis: Board of Education, January 13, 1949. 10 p.
138. SOPER, WAYNE W. "Predicting the Number of Pupils and Teachers in Public Schools from Birth Rate Trends." *Improving Educational Research.* Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1948. p. 192-97.
139. SPEARS, HAROLD. *Holding Power of the San Francisco Schools.* San Francisco: Board of Education, November 26, 1947. 11 p.

140. SPRUNT, JULIE W., and FINGER, FRANK W. "Auditory Deficiency and Academic Achievement." *Journal of Speech and Hearing Disorders* 14: 26-32; March 1949.

141. STINCHFIELD-HAWK, SARA. "Personality Measurement in Speech Correction." *Journal of Speech and Hearing Disorders* 13: 307-12; December 1948.

142. STRANG, RUTH. "Varied Techniques for Teachers." *Educational Leadership* 5: 535-39; May 1948.

143. STRAUSS, ALFRED A., and LEHTINEN, LAURA. *Psychopathology and Education of the Brain-Injured Child.* New York: Grune and Stratton, 1947. 206 p.

144. SWEM, BOYD R. "Might Have Beens." *American Vocational Journal* 24: 3-4; December 1949.

145. THOMPSON, JEAN A. "Children's Fears in Relation to School Attendance." *Bulletin of the National Association of School Social Workers* 24: 3-14; September 1948.

146. THORNE, FREDERICK. "Counseling and Psychotherapy with Mental Defectives." *American Journal of Mental Deficiency* 52: 263-71; January 1948.

147. TOMPKINS, ELLSWORTH. "Where Are the Boys?" *School and Society* 70: 8-10; July 2, 1949.

148. TRACHT, VERNON S. "Preliminary Findings on Testing the Cerebral Palsied with Raven's 'Progressive Matrices'." *Journal of Exceptional Children* 15: 77-79; December 1948.

149. TRAXLER, ARTHUR E. "Emerging Trends in Guidance." *School Review* 58: 14-23; January 1950.

150. TYSZKOWSKI, W., and LASLETT, HERBERT R. "Some Characteristics of Physically Defective Students." *Educational Administration and Supervision* 34: 347-59; October 1948.

151. UNDERSTANDING THE CHILD. "Absent from School Today." *Understanding the Child* 19: 37-39; April 1950.

152. U. S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS. *Forecasts of Population and School Enrollment in the United States: 1948 to 1960.* Current Population Reports, Series P-25, No. 18. Washington, D. C.: the Bureau, February 14, 1949. 16 p.

153. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY *The School Comes to the Home-bound Child.* Education Briefs, No. 13. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 15 p. (Mimeo.)

154. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. "Statistics of Special Schools and Classes for Exceptional Children, 1947-48." *Biennial Survey of Education in the United States, 1946-48.* Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. Chapter 5, 82 p.

155. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *Why Do Boys and Girls Drop Out of School and What Can We Do About It?* Circular No. 269. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 72 p.

156. U. S. PRESIDENT'S COMMISSION ON HIGHER EDUCATION. *Higher Education for American Democracy.* New York: Harper and Brothers, 1948. 6 vols. in 1.

157. VAN DER JAGT, ERVIN R., and ANGELL, GEORGE W. "Should Accelerated Students be Penalized by Admission Requirements?" *School and Society* 71: 198-200; April 1, 1950.

158. WAELSCH, HEINRICH. "A Biochemical Consideration of Mental Deficiency—The Role of Glutamic Acid." *American Journal of Mental Deficiency* 52: 305-13; April 1948.

159. WAELSCH, HEINRICH. "The Metabolism of Glutamic Acid." *Lancet* July 2, 1949. p. 1-4. (7 Adam St., Adelphi, London W. C. 2, England.)

160. WALTERS, H. G. "Pupil Progress in Richmond Schools." *Teachers College Journal* 20: 47; December 1948.

161. WALTERS, RAYMOND. "Report on Enrollment Trends in Higher Education." *School and Society* 72: 43-44; July 15, 1950.

162. WALTERS, RAYMOND. "Statistics of Attendance in American Universities and Colleges, 1949." *School and Society* 70: 388-98; December 17, 1949.

163. WHITE, HARLAND W. "A Study of College Enrollment Potential from Indiana High Schools." *College and University* 23: 543-48; July 1948.

164. WHITE, REUEL C. "Demand for Higher Education in the Cleveland Area." *College and University* 25: 432-36; April 1950.

165. WIENS, DAVID J. "Attendance Service in the Cleveland Public Schools." *American School Board Journal* 119: 37-38; September 1949.
166. WILLIAMS, ROBERT L. "Four Principles in the Collection of Enrollment Statistics on a Comparable Basis." *College and University* 24: 374-77; April 1949.
167. WILSON, FRANK T. "A Survey of Educational Provisions for Young Gifted Children in the United States and of Studies and Problems Related Thereto." *Journal of Genetic Psychology* 75: 3-19; September 1949.
168. WOELLNER, ROBERT C. "Early School Leavers." *School Review* 58: 1-4; January 1950.
169. ZAKOLSKI, FRANCIS C. "Studies in Delinquency: I. Personality Structure of Delinquent Boys." *Journal of Genetic Psychology* 74: 109-17; March 1949.
170. ZIMMERMAN, FREDERIC T., and BURGEMEISTER, BESSIE B. "The Techniques, Dynamics, and Permanency of the Glutamic Acid Treatment of Mental Retardation." *Education* 70: 410-19; March 1950.
171. ZIMMERMAN, FREDERIC T.; BURGEMEISTER, BESSIE B.; and PUTNAM, TRACY J. "The Ceiling Effect of Glutamic Acid upon Intelligence in Children and Adolescents." *American Journal of Psychiatry* 104: 593-99; April 1948.

CHAPTER III

Programs of Guidance

ELMER E. WAGNER, DUGALD S. ARBUCKLE, and EARL F. CARNES

THE large amount of available material that describes both total as well as specific aspects of guidance programs thruout the country seems to be a fair indication that organized guidance or personnel services are becoming more common than was true three years ago. The increase, during the past few years, in the number of studies that show the extent and nature of regional and statewide guidance programs, and the gradual appearance of more evaluation studies seem to typify the recent literature as compared with the literature covered by the previous REVIEW. Evaluation studies are limited largely to specific aspects of guidance programs, a fact which evidences the need for studies that attempt to evaluate total programs as well as specific or isolated phases.

The amount of available material relating to description of guidance programs was so extensive that a great deal had to be omitted from the present review because of the lack of space. Consequently, a description of findings has been deleted, or minimized, in order to provide sufficient space for the listing of the available material.

Elementary-School Programs

A survey of the recent literature showed an increasing guidance consciousness on the part of persons interested in, or associated with, educational programs at the elementary-school level. Strang (78) stated that guidance in the elementary school is one of the three main pillars of education, the other two pillars being (a) child study, and (b) the curriculum. She stressed the role of the teacher as a guidance worker, and also the importance of having guidance specialists available. Baxter (11) stressed two aspects of guidance, corrective and preventive, and emphasized the role of the teacher as the key person. Berger (13) considered the guidance specialist as a service aide to the teacher. Smallenburg (74) listed 15 characteristics of a guidance program for the modern elementary school. The *Guidance Handbook for Elementary Schools* (67) developed by the office of the Los Angeles County Superintendent of Schools, stressed the role of the teacher in utilizing effectively the information about the nature of her pupils.

Guidance specialists appear to be playing increasingly important roles in many of the elementary schools thruout the country. Nolan (62) reported the number of certain special guidance personnel that were found in school systems in 47 cities of 50,000 to 300,000 population in 25 states.

Boyd and Schwiering (16) made a survey of child guidance and remedial reading practices in 30 communities.

Recent literature seems to indicate that there is a growing demand for counseling services in many elementary schools. Cain (20) suggested one teacher to do counseling one-half of the teaching day in elementary schools with 500 ADA or less. Kitch (48) gave some indication of the status of certain guidance personnel in the elementary schools of California. Harris (38) studied the patterns of guidance organization in 11 large city school districts, and concluded that the predominating pattern of guidance in the elementary schools studied is built upon the classroom teacher functioning as a counselor with services of the guidance department available for special problems. Kawin (47) and Hufstedler (44) described statewide (Illinois) and also local child study programs.

Very little has been reported in the literature in regard to the evaluation of elementary-school guidance programs. Anderson and Zimmermann (2) reported data in regard to the evaluation of a specific child-study program.

Secondary-School Programs

Several local, regional, or statewide surveys have been conducted which were concerned with the characteristics or extent of guidance services in secondary schools. The Subcommittee on Guidance of the North Central Association of Colleges and Secondary Schools (64, 65, 66) prepared a self-study guide for the purpose of evaluating 15 important characteristics (both minimum and extended) of a high-school guidance program. Wimmer (85) contacted 447 secondary schools thruout the country to determine the kinds of guidance services available to students. Himes and Manley (41) described the kinds and extent of guidance programs in Negro secondary schools in southeastern United States. Nolan (62) investigated the administrative structures and personnel in the special services and guidance clinics in selected large cities. Lerner (52) described the placement programs of public schools in cities of 100,000 or more. Hartley (39) studied guidance practices in schools in the state of New York. Wrenn and Dugan (86) studied the guidance procedures of nonmetropolitan high schools in Minnesota. Harris (38) surveyed 11 cities in California to study the basic philosophies of their guidance programs, the administrative organizations, and the characteristics of guidance personnel. The North Carolina Education Commission (63) reported the findings of its study of the guidance services in that state.

Descriptions of guidance programs or of aspects of programs in schools or school districts are quite common. Kitch (49) edited descriptions of programs in junior and senior high schools. Argetsinger (6) reported a cooperative project between a Veterans Administration Guidance Center and high-school guidance personnel in Minneapolis. Dingilian, MacDonald, and Stefflre (28) described an advisement service available to seniors in high schools of Los Angeles. Staton (77) outlined certain high-school guidance programs in Atlanta.

Trends in the development of guidance services are revealed in the fourth statewide survey of guidance practices in the four-year high schools of New Jersey (26, 87). A study by the Research Division of the National Education Association (59) revealed that guidance services are among the most rapidly expanding of the special services in 1598 schools.

Various characteristics of counselors in secondary schools, including their titles, training, and activities have been studied. Polmantier (69) tabulated, by job titles, members of the National Vocational Guidance Association listed in the 1948-49 Yearbook who were employed in school systems composed of Grades I-XII. Froehlich (32) reported a survey of the enrolment, number of teachers, and number of guidance officers in the secondary schools in each state. Tompkins and Gaumnitz (81) summarized data on the number of guidance counselors in the secondary schools of the United States. The training and work experience of teachers in secondary schools in the North Central area were studied by Simmers and Davis (73). Goheen and Ohlsen (35) reported the training and duties of guidance personnel in schools in the state of Washington. Arnold (7) investigated the amount of time spent in various activities by counselors in the public schools of Ohio. In a study of Negro secondary schools in the southeastern states, Manley and Himes (54) found that two out of three teachers had no training in guidance, altho the majority of the schools used teachers in their guidance programs. Benz (12) constructed a test to investigate the attributes and practices of good high-school counselors.

The U. S. Office of Education (82) has published an experimental set of criteria in the form of checklists for the evaluation of guidance programs, and a pamphlet on how to use the criteria. Lovelass (53) has edited a list of criteria for the study of the guidance services of the school. The Cooperative Study of Secondary School Standards (24) has included 16 pages of evaluative criteria for guidance services. The North Central Association (65) prepared a list of 15 criteria in the form of a self-study guide. Other evaluative instruments have been published by Moser (58) and Hines (42).

Lauck (50) found that twice as many nondelinquents as delinquents claim to have experienced formal guidance and concluded that vocational dissatisfaction in adulthood contributes to delinquency. Barabal and Brammer (10) used open-end interviewing methods with Stanford freshmen to evaluate their feelings about high-school guidance programs. Crosby (25) surveyed 10 selected California high schools to determine the costs of guidance programs.

Fowler and Nelson (31) found that high-school principals in central New York State were interested in extension services in guidance, while in Michigan, Erickson (30) discovered that school administrators want expert help in developing some 23 different aspects of guidance programs.

College Guidance Programs

College personnel programs were discussed in two recent publications by Brouwer (17) and Williamson (83). Russell (70) reported on the results of a study of guidance services in 43 Negro colleges. Gay and Gales (34) described a counseling service to deal with the academic problems of returning veterans in Wayne University. A report by the Subcommittee on Studies and Standards of the American Association of Colleges for Teacher Education (1) discussed minimum standards for student personnel services. A total college personnel program was presented by Glenn and Gobetz (36).

Numerous reports describe the various aspects of college personnel programs. Arbuckle (4) reported a study of vocational services in 15 colleges in Illinois. Bookman (15) investigated the freshman orientation technics employed in 188 institutions. Meinecke (57) discussed the placement and follow-up services in junior colleges. Counseling programs were discussed by Sifferd (72), Jones (46), and by Smith and Lipsett (76). Hilliard (40) described special clinics, and Jenkins (45) enlarged on the use of records and forms.

Williamson (84) described student personnel programs in German universities. The guidance services offered to foreign students in American universities were described by Chen (23). Smith and Lipsett (75) summarized a technic of cooperative work as practiced at Rochester Institute of Technology as a means of providing practical and realistic guidance. The National Vocational Guidance Association, Ethical Practices Committee (60) listed agencies in the United States offering vocational counseling services. Carroll (21) completed a survey of types of personnel workers that were employed in liberal arts colleges.

Industry, Government Services, and Private Agency Programs

Marrow (55), discussing the role of group dynamics in industry, reported the studies made by Lewin on the personnel programs of the plant of the Harwood Manufacturing Company in the city of New York. Medvin (56) summarized the results of five occupational surveys of the U. S. Employment Service. The 1949 College Placement Program prepared by local Tennessee employment offices was outlined by Thompson and Goad (80). Arbuckle and Gordon (5) described the counseling programs in industry and the roles played by management, unions, and the community. The counseling methods employed in three industries are discussed by Green (37). The development and the integration of a guidance center with other community services was discussed by Deisenroth (27). Cabot (19) detailed the development of a records system in industry. An unusual article (3), author unknown, described a personnel program that failed.

Bisson (14) discussed the activity of the National Employment Services

Youth Guidance Councils thruout Canada. The guidance role of Britain's National Institute of Industrial Psychology was characterized by Chapman (22).

Veterans Administration Advisement Programs

Phillips and Mella (68) outlined a program of vocational rehabilitation at the Coatesville Veterans Administration Hospital at Coatesville, Pennsylvania. Barabal (9) presented an excellent guide to those planning to convert a Veterans Administration Center into a university or community counseling center. Entwisle (29) discussed a client evaluation of a Veterans Administration Guidance Service at Newark College. A number of studies of Veterans Administration programs were reported by Gaudet (33). He concluded that a substantial research program should be implemented to raise the program to its highest possible level of service efficiency. The contributions of the Veterans Administration to guidance programs were summarized by Scott (71). Leis (51) completed an experimental study in which he compared the vocational adjustment of advised and nonadvised veterans.

Military Service Programs

Three years of research by the test and research section of the Bureau of Naval Personnel were detailed and analyzed by Stuit (79). Newland (61) described the cadet personnel problems and procedures at West Point while Baier (8) sketched the work of the personnel research section of the Adjutant General's office on the problems of selecting and appraising West Point cadets. Hines (43) reported on an internship program thru which service personnel received specialized training in industry. Burbank (18) described the Army's Career Guidance Plan. Under this plan, the Army has undertaken the analysis and classification of jobs, plus counseling based on interviews and testing.

Bibliography

1. AMERICAN ASSOCIATION OF COLLEGES FOR TEACHER EDUCATION, SUBCOMMITTEE ON STUDIES AND STANDARDS. "Standards for Student Personnel Services and Evaluation Criteria." *Third Yearbook, 1950*. Oneonta, N. Y.: American Association of Colleges for Teacher Education, a department of the National Education Association (Secy.: C. W. Hunt, State Teachers College), 1950. p. 125-47.
2. ANDERSON, ROBERT, and ZIMMERMANN, ELIZABETH. "Evaluating a Child Study Program." *Educational Leadership* 7: 568-72; May 1950.
3. ANONYMOUS. "A Personnel Program That Failed." *Personnel Journal* 27: 414-16; April 1949.
4. ARBUCKLE, DUGALD S. "Vocational Services in Colleges." *Occupations* 27: 28-34; October 1948.
5. ARBUCKLE, DUGALD S., and GORDON, THOMAS. *Industrial Counseling*. Boston: Bellman Publishing Co., 1949.

6. ARGETSINGER, GLENN D. "High School Seniors at a V. A. Guidance Center." *Occupations* 27: 181-83; December 1948.
7. ARNOLD, DWIGHT L. "Time Spent by Counselors and Deans on Various Activities." *Occupations* 27: 391-93; March 1949.
8. BAIER, DONALD E. "Selection and Evaluation of West Point Cadets." *Educational and Psychological Measurement* 8: 193-99; Summer 1948.
9. BARABAL, GEORGE D. *Converting a Veteran's Guidance Center.* Stanford, Calif.: Stanford University Press, 1950.
10. BARABAL, GEORGE D., and BRAMMER, LAWRENCE M. "What Do College Freshmen Think of Their High School Counseling?" *California Journal of Secondary Education* 25: 328-31; October 1950.
11. BAXTER, EDNA D. "What Is Guidance?" *Childhood Education* 25: 202-205; January 1949.
12. BENZ, STANLEY C. *An Investigation of the Attributes and Techniques of High School Counselors.* Studies in Higher Education 44. Further Studies in Attitudes, Series 12. Lafayette Ind.: Purdue University, Division of Educational Reference, 1948. 44 p.
13. BERGER, DONALD W. "Guidance in the Elementary School." *Teachers College Record* 49: 44-50; October 1947.
14. BISSON, J. GONTRAN. "A Plan Advocating a Specialized Employment Service for Young Workers in Canada." *Occupations* 27: 38-41; October 1948.
15. BOOKMAN, GLADYS. "Freshman Orientation Techniques in Colleges and Universities." *Occupations* 27: 163-66; December 1948.
16. BOYD, GERTRUDE, and SCHWIERING, OSCAR. "Survey of Child Guidance and Remedial Reading Practices." *Journal of Educational Research* 43: 494-506; March 1950.
17. BROUWER, PAUL J. *Student Personnel Services in General Education.* Washington, D. C.: American Council on Education, 1949.
18. BURBANK, NATT B. "Army Adopts Guidance Plan." *Nation's Schools* 43: 25; March 1949.
19. CABOT, P. S. DE Q. "Personnel Records—A New Slant." *Personnel Journal* 26: 362-68; April 1948.
20. CAIN, EDGAR V. "Practical Guidance Techniques for the Elementary School." *Sierra Education News* 43: 22-23; October 1947.
21. CARROLL, MARIAN. "Overview of Personnel Workers in Colleges and Universities." *Journal of the National Association of Deans of Women* 14: 3-33; October 1950.
22. CHAPMAN, J. VINCENT. "Britain's National Institute of Industrial Psychology." *Occupations* 28: 191-93; December 1948.
23. CHEN, THEODORE HSI-EN. "The Guidance of Foreign Students." *Journal of Higher Education* 21: 126-31, 166; March 1950.
24. COOPERATIVE STUDY OF SECONDARY SCHOOL STANDARDS. *Evaluative Criteria.* Washington, D. C.: the Study, 1950. 305 p.
25. CROSBY, JOSEPH W. *An Analysis of the Cost of Guidance Services in Selected High Schools.* Doctor's thesis. Los Angeles: University of Southern California, 1950. 320 p.
26. CUNLIFFE, REX B. "Progress in Vocational Guidance—Anyway There's More." *American Vocational Journal* 23: 15-28; May 1948.
27. DEISENROTH, CARL E. "A Community Centered Guidance Program." *Employment Service Review* 15: 29-30; 1947.
28. DINGILIAN, DAVID H.; MACDONALD, CATHERINE; and STEFFLRE, BUFORD. "New Type of Advisement Service." *California Journal of Secondary Education* 23: 488-92; December 1948.
29. ENTWISLE, FRANK N. "Client Opinion of a Vocational Testing and Guidance Program." *School and Society* 71: 38-41; January 21, 1950.
30. ERICKSON, CLIFFORD S. "School Administrators Want Help." *Occupations* 27: 234-36; January 1949.
31. FOWLER, SEYMOUR, and NELSON, A. GORDON. "A Survey of Interest in a Proposed Extension Service in Guidance." *Journal of Educational Research* 42: 700-703; May 1949.
32. FROEHLICH, CLIFFORD P. "Counselors and Guidance Officers in Public Secondary Schools." *Occupations* 26: 523-27; May 1948.

33. Gaudet, Frederick J. "The Veterans Administration Advisement and Guidance Program." *School and Society* 69: 251-54; April 2, 1949.
34. Gay, Alva A., and Gales, Harold D. "The Liberal Arts Veterans Counselors' Office." *School and Society* 69: 209-12; March 19, 1949.
35. Goheen, Philip, and Ohlsen, Merle. "The Guidance Worker's Job and His Preparation." *Bulletin of the National Association of Secondary-School Principals* 34: 242-47; January 1950.
36. Glenn, William D., Jr., and Gobetz, Wallace. "College Students Personnel Services." *Handbook of Applied Psychology*, Vol. II. New York: Rhinehart and Co., 1950.
37. Green, Carolyn. "Vocational Guidance in Industry." *Occupations* 28: 531-32; May 1950.
38. Harris, Ruby D. "Patterns of Guidance Organization." *California Journal of Secondary Education* 25: 59-61; January 1950.
39. Hartley, David. *Guidance Practices in the Schools of New York State.* Albany: University of the State of New York, February 1949. 85 p. (Mimeo.)
40. Hilliard, George H. "Special Clinics as an Aid to College Students." *Student Personnel Services.* Oneonta, N. Y.: American Association of Colleges for Teacher Education, a department of the National Education Association (Secy.: C. W. Hunt, State Teachers College), 1949. p. 178-88.
41. Himes, Joseph S., Jr., and Manley, Albert E. "Guidance in Negro Secondary Schools in the Southeastern Region." *Journal of Negro Education* 17: 106-13; Spring 1948.
42. Hines, William E. "A Vocational Guidance Score Card for High Schools." *California Journal of Secondary Education* 24: 114-19; February 1949.
43. Hines, William E. "The Army Learns from Industry." *Army Information Digest*, December 1949. p. 18-22.
44. Hufstedler, Virginia. "The Child Study Program in Corpus Christi." *Educational Leadership* 7: 555-58; May 1950.
45. Jenkins, Nora Congdon. "Personnel Records and Forms." *Student Personnel Services.* Oneonta, N. Y.: American Association of Colleges for Teacher Education, a department of the National Education Association (Secy.: C. W. Hunt, State Teachers College), 1949. p. 197-216.
46. Jones, Lonzo. "Basic Principles in the Orientation and Administration of Student Personnel Services." *Student Personnel Services.* Oneonta, N. Y.: American Association of Colleges for Teacher Education, a department of the National Education Association (Secy.: C. W. Hunt, State Teachers College), 1949. p. 9-24.
47. Kawin, Ethel. "A Cooperative Approach to Child Study." *Educational Leadership* 7: 563-67; May 1950.
48. Kitch, Donald E. "Guidance Services in California Schools." *California Schools* 21: 385-89; November 1950.
49. Kitch, Donald E., editor. "Organizing the Counseling Service." *California Journal of Secondary Education* 23: 472-87; December 1948.
50. Lauck, Marie T. "A Search for Evidence that Guidance in School Prevents Delinquency in Adults." *School Review* 56: 26-35; January 1948.
51. Leis, Ward W. *A Comparison of the Vocational Adjustment of Advised and Non-Advised Veterans while in Training.* Doctor's thesis. Los Angeles: University of Southern California, 1948.
52. Lerner, Leon L. "Placement by Public Schools." *Occupations* 27: 322-25; February 1949.
53. Lovelass, Harry D. *How To Conduct the Study of the Guidance Services of the School.* Curricular Series A, No. 51. Springfield: Illinois State Department of Public Instruction, May 1949. 263 p.
54. Manley, Albert E., and Himes, Joseph S., Jr. "Guidance: A Critical Problem in Negro Secondary Education." *School Review* 56: 219-22; April 1948.
55. Marrow, Alfred. "Group Dynamics in Industry—Implications for Guidance and Personnel Workers." *Occupations* 26: 472-76; May 1948.
56. Medvin, Norman. "New Techniques for Community Occupational Surveys." *Occupations* 26: 532-36; May 1948.
57. Meinecke, Charlotte Drummond. "Placement and Follow-up in Junior Colleges." *Junior College Journal* 19: 59-67; October 1948.

58. Moser, Wilbur E. "Evaluation of a Guidance Program by Means of a Student's Check List." *Journal of Educational Research* 42: 609-17; April 1949.
59. National Education Association, Research Division. "Trends in City School Organizations, 1938-1948." *Research Bulletin* 27: 4-39; February 1949.
60. National Vocational Guidance Association, Ethical Practices Committee. "National Vocational Guidance Association Directory of Vocational Counseling Services." *Occupations* 27: 570-96; May 1949.
61. Newland, T. Ernest. "Cadet Personnel Problems and Procedures at the United States Military Academy." *Educational and Psychological Measurement* 7: 489-97; Autumn 1947.
62. Nolan, William J. "A Survey of Practices in Meeting Pupil Adjustment Needs." *Journal of Educational Research* 42: 268-78; December 1948.
63. North Carolina Education Commission. "Pupil Personnel Services in a State School Program." *High School Journal* 32: 35-37; January-February 1949.
64. North Central Association of Colleges and Secondary Schools, Committee on Fundaments, Subcommittee on Guidance. "Characteristics of a High School Guidance and Counseling Program." *North Central Association Quarterly* 22: 219-47; October 1947.
65. North Central Association of Colleges and Secondary Schools, Committee on Current Educational Problems, Subcommittee on Guidance. "Extended or Potential Optimum Guidance Practices in Small, Medium and Large North Central High Schools, 1948-49." *North Central Association Quarterly* 24: 174-246; October 1949.
66. North Central Association of Colleges and Secondary Schools, Committee on Current Educational Problems, Subcommittee on Guidance. "Report of the Self-Study Survey of Guidance Practices in North Central Association High Schools for the School Year 1947-48." *North Central Association Quarterly* 23: 276-303; January 1949.
67. Office of Los Angeles County Superintendent of Schools. *Guidance Handbook for Elementary Schools.* Los Angeles: California Test Bureau, 1948. 158 p.
68. Phillips, John C., and Mella, Hugo. "Vocational Rehabilitation of Neuropsychiatric Patients." *Occupations* 28: 311-14; February 1950.
69. Polmantier, Paul C. "Titles of School Guidance Workers." *Occupations* 28: 349-52; March 1950.
70. Russell, Roger D. "Guidance Developments in Negro Colleges." *Occupations* 28: 25-27; October 1949.
71. Scott, Ira D. "Contributions of the Veterans Administration's Advisement and Guidance Program." *Educational and Psychological Measurement* 9: 405-11; Autumn 1949.
72. Sifferd, Calvin S. "Evaluating a Residence Hall Counseling Program." *School and Society* 69: 452-54; June 25, 1949.
73. Simmers, Lylah M., and Davis, Robert A. "Training and Experience of Counselors in North Central Schools." *School Review* 57: 476-84; November 1949.
74. Smallenburg, Harry W. "Characteristics of a Guidance Program for the Modern Elementary School." *California Journal of Elementary Education* 16: 130-38; February 1948.
75. Smith, Leo F., and Lipsett, Laurence. "Guidance Through Cooperative Work." *Occupations* 27: 187-90; December 1948.
76. Smith, Leo F., and Lipsett, Laurence. "Community Counseling Responsibilities." *Journal of Higher Education* 20: 206-208; April 1949.
77. Staton, Thomas F. "Guidance and Counseling in the Five Year Community High Schools of Atlanta." *Peabody Journal of Education* 27: 38-44; July 1949.
78. Strang, Ruth M. "Guidance in the Elementary School." *Education* 70: 492-94; April 1950.
79. Stuit, Dewey B., editor. *Personnel Research and Test Development in the Bureau of Naval Personnel.* Princeton: Princeton University Press, 1947.
80. Thompson, Albert S., and Goad, Robert O. "College Graduates in Tennessee Use Their Public Employment Service." *Occupations* 28: 102-105; November 1949.
81. Tompkins, Ellsworth, and Gaumnitz, Walter H. *High School Staff and Size of School.* Circular No. 317. Washington, D. C.: U. S. Office of Education, Federal Security Agency, 1950. 24 p.

82. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *Criteria for Evaluating Guidance Programs in Secondary Schools, Form B.* Committee Report to Eighth National Conference of State Supervisors of Guidance Services and Counselor Trainers, Misc. 3317. Washington, D. C.: the Office, 1949. 33 p.
83. WILLIAMSON, EDMUND G. *Trends in Student Personnel Work.* Minneapolis: University of Minnesota Press, 1949.
84. WILLIAMSON, EDMUND G. "Impressions of Student Personnel Work in German Universities and Implications for America." *Educational and Psychological Measurement* 7: 519-37; Autumn 1947.
85. WIMMER, NANCY E. "Guidance in Secondary Schools." *School Review* 56: 343-49; June 1948.
86. WRENN, C. GILBERT, and DUGAN, WILLIS E. *Guidance Procedures in High School.* The Modern School Practices Series, No. 1. Minneapolis: University of Minnesota Press, 1950. 71 p.
87. ZERAN, FRANKLIN R., and JONES, GALEN. "National Picture of Guidance and Pupil Personnel Service." *Bulletin of the National Association of Secondary-School Principals* 32: 52-73; October 1948.

CHAPTER IV

Appraisal of the Individual

PAUL L. DRESSEL and WILLIAM A. MANN

THE trends noted in the April 1948 REVIEW, on the whole, seem to have continued during the ensuing three-year period. A large number of studies of both old and new projective technics have appeared with greatest emphasis on the Rorschach and the Murray thematic apperception tests. Many of the studies involving these technics have sought to extend their applicability to selection and prediction in education and industry, but the conclusions have generally been negative or, at least, indecisive. There seems to have been a growing acceptance of the need for validation, but no really significant validation studies have been noted.

The *Minnesota Multiphasic Personality Inventory* has continued to be the subject of many studies, but research of any significance involving other personality inventories has notably declined.

The trend noted three years ago toward the development of brief screening tests, particularly of abbreviated intelligence tests, was still in evidence. The main interest in these appeared to be in those clinical situations where emotional disturbance, illiteracy, or other conditions render longer tests inadvisable.

Interest in profile analysis, or in score configurations as a basis for insight into intra-individual variations was still evidenced in many studies. In a somewhat similar vein, there have been a number of systematic attempts to characterize job families or occupational groups by profiles or factor patterns.

Surprisingly, relatively few studies of the various batteries of differential aptitude tests have appeared. Whether this is a result of lack of interest or of the difficulties met in carrying out such studies is not certain. There has been a marked trend toward development or study of professional aptitude tests. Tests for selection of candidates in the fields of law, medicine, veterinary medicine, dentistry, pharmacy, actuarial science, and scientific research have been reported on. It is notable that at the professional level, there has not, thus far, been any single battery of tests which would provide differential diagnosis for the various professional fields analogous to the batteries under discussion and study at lower levels.

The large number of studies which have attempted to measure persistence, motivation, and other such traits is perhaps indicative of a feeling that further improvement of prediction of success in education depends largely on the successful appraisal of qualities other than intelligence and achievement.

To anyone familiar with the very extensive literature of the last three years in the field, it will be obvious that this review cannot provide a full coverage. Neither must the selection of studies reported on be regarded as any more than a selection out of those coming to the authors' attention which seemed to illustrate trends noted earlier or to suggest other and less clearly defined trends. Volume I of the *Annual Review of Psychology* (109) is a noteworthy additional publication of this type. It contains several articles which, in toto, provide a somewhat more adequate coverage of research in this area than is possible in this single chapter.

Appraisal in Areas of Personality and Adjustment

Interview Information. Probably the most frequently used and best source of information about an individual is the interview. Kadis and Lazarsfield (65) used this method in studying the discrepancies between free recollections and images. Hall (53) views dreams as personal documents and projections which can be employed for the appraisal of the inner dynamics of personality. He analyzed series of dreams as a unified and coherent structure. Analysis was organized into (a) social agreement, (b) internal agreement, (c) external agreement, (d) agreement with the future, and (e) agreement with the past. Evidence for the validity of this breakdown was presented.

Empathy. Remmers (93), and Dymond (33) developed tests of empathy by determining how well individuals could predict how friends would react to questions of personality. Sheerer (103) studied the relationship between attitudes toward self and attitudes toward others. The study indicated that the individual's evaluation of himself and his worth as a person can be significantly altered by the therapeutic process and that the individual's evaluation of others, the degree of acceptance and respect he feels for them, is significantly related to his attitude toward himself. Powell (89) used: (a) the neurotic tendency and sociability scales on the Bernreuter as a self-rating scale, (b) dormitory counselors' judgments about the subjects in the study as an expert opinion, and (c) a sociometric test composed of six activities ranked by the subjects themselves to make comparisons of personal adjustment.

Social Status. Studies of the social status of the individual are becoming more frequent as counselors attempt to get the complete picture of the individual. Grossman and Wrighter (47) studied the relationship between a selection-rejection ratio and intelligence, social status, and personality among sixth-grade children. French (40) in studying social status found the social structure of the group and social status of the rater were important variables to be considered. He concluded (a) that individuals of high status are rated high by the group on traits which are presumably most valued socially, (b) that the sociometric status of the rater is in some cases a significant factor in his ratings of other individuals, and (c) that sociometric status is found to be a factor in some self-ratings when the effects of differences in ratings received from the group are eliminated statistically. Young (125) used five objective tests of social status with elementary-school pupils. The tests included the *School Opinion Poll*, a citizenship test, the *Ohio Social Acceptance Scale*, the *Ohio Recognition Scale*, and a sociometry test consisting of seven potentials.

Questionnaires and Personal Documents

The Minnesota Multiphasic Personality Inventory. The MMPI continued to lead all of the structured personality inventories in the amount of research reported. While most of the earlier research on this instrument was done in a hospital setting, later research has been conducted in a variety of situations. Hawkes (56) reported the use of the MMPI to screen college students for counseling purposes and found that those scoring two or more sigmas above the mean in any category had fewer appropriate interests and rated low in social participation. Wiener and Phillips (123) gave the MMPI to a group of clients and repeated it at two-month intervals during therapy and found that the changes in the inventory profile were in agreement with changes described by the client.

The Bernreuter Personality Inventory. Martin (82), in his study of the Bernreuter, employed factor analysis and concluded that it did not distinguish between self-consciousness and introversion and that most of the measuring effectiveness could be found in the F_1 and F_2 scales. Donceel, Alimena, and Birch (29) used the Bernreuter to study the influence of prestige suggestion in answer to a personality inventory.

The Bell Adjustment Inventory. Brower and Sands (12) used this inventory to study the effect of personal adjustment on reaction time to emotionally charged words. Lovell, Laurie and Marvin (76) compared the effectiveness of the Bell with the *Minnesota Personality Scale* in screening students for counseling. Correlations with a specially constructed rating scale were higher for the Minnesota scale. It was also more effective in screening lower deviants.

Inter-Inventory Studies. Weinland (120) reported a study in which various inventories were administered to the same clients. When the inventories showed high correlation they tended to validate each other. This suggests that the use of ratings and personal inventories can be improved by constructing them in parallel to measure the same individuals in the same characteristics by different methods. Ellis (35) used direct and indirect phrasing on questions that were common to a number of inventories. He found that the order of presentation was important but that neither type was more effective than the other. Questions that distinguished best for children's groups dealt with school activities. Gough and others (46) studied the relationships between ethnic attitudes and certain personality factors. They concluded that personal adjustment should be a basis for developing acceptance of other ethnic groups.

Miscellaneous Documents. Kofka and Bolger (70) found future autobiographies valuable in the clinical study of individuals. They considered the clients structuralization of the future, the extent to which reality factors were taken into account, and the specific content of the material. Bugental and Zelen (16) studied self-concept with the W-A-Y technic and analyzed their replies along 17 categories. Using the question, "Who are you?" an investigation into the self-perception of subjects is reported. This allows a free field for the responses to be structured along lines most expressive of the client's needs and most meaningfully related to his current situation. First results indicated only the practicality of their categories. Symonds (113) asked 130 graduate students to write of experiences which gave them release of repressed emotions.

Projective Tests—The Rorschach and Thematic Apperception Tests. While many projective devices have been utilized during this period, the *Rorschach Test* and *Thematic Apperception Test* have continued to receive the most attention. The chief studies with the Rorschach dealt with refining the interpretation of results and its use for new purposes. Hertzman and Pearce (57) studied the meaning of the human figure in responses to the Rorschach cards. They found that with some people, tho not with all, the human responses represented keenly felt attitudes about one's self and environment. The frequency with which meaning emerges is roughly correlated with the number of human responses produced. Morris and Nicholas (83) used the Rorschach with children having primary behavior disorders and also with the children's parents. They discovered that on 15 of the 20 personality variables studied, there appeared to be evidence that significant homogeneity existed among all three members of the family group. Goldfarb (42) used this test with family-reared, institution-reared, and schizophrenic children. The institutional and schizophrenic children were similar in many signs but differed in others. The *Rorschach Test* confirmed that both groups were deficient in rational control, regard for reality, consistent drive for intellectual and social attainment, and emotional maturity. Prados and Fried (90) studied the personality structure of the older age groups. Sen (102) made a statistical study of the Rorschach using factor analysis and found that interpretation of responses indicative of intelligence and neurotic tendencies were confirmed but that color and movement seem to rest on preconceived hypotheses rather than on verifiable evidence.

The *Thematic Apperception Test* appeared to be more useful than the Rorschach in therapy. Bellak, Pasquarelli, and Brannerman (6) found that the stories told about TAT pictures can be used for association and interpretation in therapy. The test was particularly valuable in cases of general blocking, dearth of associations, resistance, protectiveness, and depression with little verbalization. Deabler (26) found the TAT helpful in letting the patient tell his story without identifying himself too closely. By withholding interpretation and reflecting attitudes and feelings the patients were helped to work out solutions to their problems. Gough (45) studied the frame of reference of clients reacting to the TAT and confirmed Deabler's findings for clients who did not know the purpose of the test. Rosenzweig (97) studied patients and their close kin with the TAT to discover complementary dynamics.

Other Projective and Expressive Devices. Calabresi (17) found the *Szondi Test* an excellent tool for the evaluation of the role of overt and repressed aggressiveness in the dynamics of personality deviations and mental disorders. Dorkey and Amen (30) used two new series of 14 pictures each. They found that there was a direct relationship between anxieties and the faces children chose for the faceless figures. The correlation of .59 between test results and teacher ratings indicated a positive relationship between test results and behavior patterns. Lehner and Silver (74), using the *Draw-a-Person Test,* found that clients assigned ages to the figures of their drawings equal approximately to their own age. After the age of 25 years they tended to make the figures younger. McCurdy (78), using the *Goodenough Draw-a-Man Test* with first-grade children in a series for a group and for individuals, found that ability to draw fluctuated in a manner similar to the Binet IQ. Buck (15) used the *House-Tree-Person Test.* He concluded that it gives clients both verbal and non-verbal expression, works well with withdrawn and low intelligence persons, and being unstructured compels projection. The drawing is frequently so emotion-producing that during it or afterwards subjects can verbalize hitherto suppressed material. The postdrawing interrogation system permits the subject to define, interpret, and associate concerning his drawn productions, and provides him also with an opportunity for further projection. Its scoring is not well objectified nor are the results identified with specific syndromes. Reichenberg-Hackett (92) designed a *Geosign Test* using a semistructured drawing situation. He found that the general design produced plus a written statement was useful for rough screening to find persons needing counseling. Falls and Blake (37) tried a statistical study of the *Rosenzweig Picture-Frustration Test.* They analyzed four of the seven major components and correlated the scores with status measures of personality, scholastic aptitude, achievement, interests, and childhood socio-economic status. Their conclusion was that components of behavior measured by this test yield results consistent with theoretical expectancy.

Harrower (55) studied 500 psychiatric cases, for whom scores on most of the more common projective tests were available. She then asked them what was the most unpleasant thing they could think of and asked them to draw it either actually, schematically, or symbolically.

Abbreviated Scales, and Clinical Studies. A number of studies were reported on the use of abbreviated scales that can be used when time does not permit the use of longer tests and inventories. Altus (2) reported the use of a 13-point general information scale that correlates .73 with five verbal subtests of the Wechsler. He concluded that the validity of a test is not entirely a function of its length. Clark (21, 22) used the *Altus Thirty-Six Item Adjustment Test* in screening persons needing psychiatric help. He found the test had a high correlation with the neurotic triad of the MMPI. This test was also valuable in screening illiterates and AWOL's. Hunt and French (62) studied the use of abbreviated scales from the Wechsler, Picture Completion, and McGill Picture and found them promising for identifying schizophrenics and mental defectives. Gough's (44) 21-item *Home Index Inventory*, used to determine socio-economic status, proved to have high reliability and good correlations with longer measures of the same trait.

Interest in analysis of the Wechsler-Bellevue subscores has continued in the last three years. Kogan (71) reported on the relationship between psychometric patterns and psychiatric diagnosis. Blake and McCarty (10) found that both the profile of the W-B and Allen's Brain Injured Patients differed significantly from the normal. The W-B profile did as good a job as Allen's Index. Shoben (104) tested the Rashkis-Welsh hypothesis that anxiety may be detected by means of various signs on the W-B and got negative results. Klein (68) used the multiple regression principle to increase the power of subscores of the W-B to separate schizophrenics from normals. He found that the weighted scores were much more predictive than unweighted ones. The best indication of schizophrenia was impairment in comprehension, picture arrangement, arithmetic, and digit symbol.

Appraisal in Education

Work on coordinated batteries of tests which appraise and differentiate a number of aptitudes continued. Guilford and Zimmerman (48) reported on the development of, and success with, an aptitude survey embracing seven primary aptitudes, with 13 more in prospect. Adequate norms and validation data have yet to be collected. Stuit (111), in an earlier issue of the REVIEW, summarized studies involving a number of batteries of this type.

Travers and Wallace (115) developed and studied an academic aptitude test for use at the graduate level. This test was patterned after the ACE, but was much more difficult than the former test. On the basis of their experience with this test they recommended the use of vocabulary and reasoning scores rather than the now almost traditional verbal and numerical.

The *Mooney Problem Checklist* was used by Gordon (43) to study problem changes of individuals over a 9-day period. Changes found were checked by independent evidence, thus throwing light on the sensitivity of the instrument.

A great deal of activity in the measurement of interests was found. Fowler (39) studied item response consistency for items of the activity preference type and found that the "most" response was remarkably stable regardless of order, number of possible responses, or interviewing time level. The "least" response was somewhat less consistent, altho lapse of time changed these responses but little. Prestige of an occupation was found by Fehrer and Strupp (38) to be an insignificant factor in determining choice of occupational preference. Kreidt (72), Strong (110), and Kleist, Ritterhouse and Farnsworth (69), respectively, have prepared new keys for psychologists, accountants, and music teachers on the *Strong Vocational Interest Blank.*

Heston (59) made a rather careful study of the relationship of the masculinity-feminity scales on the MMPI, Strong, Kuder, and Depauw adjustment inventories. The scales were about 80 percent successful in differentiating men from women. The MMPI was somewhat the best of the four.

Berdie (9) compared self-ratings to scores on the Kuder and the Strong. Correlations of about .50 between measured interests and estimates were found, with the Kuder showing a closer relationship to estimates than the Strong. These findings largely corroborate those of similar studies, including those which suggest that Kuder results can be faked easier than the Strong.

Problems of Prediction

The differential predictive value of the Q, L, and T scores and the ACE psychological examination was under investigation. Wallace (118) found the highest correlation to be .49 between English grades and combined Q and L scores, with part scores showing little differentiation. The general lack of differential prediction found in use of Q and L scores suggests that the recommendation of Travers and Wallace (115) earlier noted, bears some investigating.

There has been a great deal of activity in using test batteries to predict success in a variety of professional schools. Lord, Cowles, and Cynamon (75) found that the seven-test *Pre-Engineering Inventory* yielded correlations of .38 to .68 with first term engineering grades. Adams and Stuit (1) found that the *Iowa Legal Aptitude Test* (1946 revision) as a predictor was little better than the undergraduate point average, but recommended the use of the test with students whose undergraduate work was of doubtful quality. The three best subtests (reasoning, relevancy, information) gave a multiple correlation of .59 with grades. Barr (5) reviewed and summarized studies dealing with prediction of teaching efficiency. He found that multiple r's of .70 and .80, resulting from the combination of subjective and objective measures were not uncommon. Studies in the medical aptitude field have centered around the *Professional Aptitude Test.* Stuit's (112) review and summary of this field placed quality and quantity of undergraduate work ahead of intelligence and aptitude tests for prediction of success in medical school. Remmers and Gage (94) obtained multiple correlation of .61 and .76 with grades in 40 schools of pharmacy, using a battery of tests including the ACE, *Purdue Mathematics Training Test, Purdue Physical Science Test,* and a *Cooperative English*

Test. They concluded that factorially pure tests are needed for greater validity.

The search for factors other than intelligence which might improve the prediction of college success has resulted in a multiplicity of studies. McCurdy (77), working with a sample of 30 women in a southern college, concludes that basal metabolism adds enough to grade prediction to be included as one of the probable determinants of the level of schoolwork. DiVesta, Woodruff, and Hestil (28) developed an Orientation inventory made up of a list of habits conducive to success. It was noted that students earning their own expenses were among the most highly motivated in college. French (40) obtained a measure of persistence by tempting students to give up early on a test composed of difficult number series problems. The quality thus measured showed some correlation with grades, but none with the tests themselves. Ostrom (87) found evidence supporting earlier suggestions that the OL score of the *Strong Vocational Interest Blank* be used as a measure of survival power for prediction of college success. A study by Rausch (91) suggested that variability in performance may be an important factor in prognosis.

The use of projective technics in grade predictive studies has been a subject of considerable study. Osborne and Sanders (86) used the *Harrower-Erickson Multiple Choice Rorschach* to study the differences between college achievers and nonachievers. The results appeared too inconclusive for individual differentiation.

Hadley and Kennedy (50) studied the use of a sentence completion test and related the results to academic success. The method appeared to have some possibilities of assisting in the exploration of discrepancies between high tested intelligence and low achievement.

Hake and Ruedisili (52) studied the relationship of Kuder Preference Record scores and subject grades. They found, as have others, low correlations (.25 and under) and concluded that measured interests are a relatively minor factor in success.

Appraisal in Industry

Clark (24) investigated rather thoroly the interest patterns at the skilled trades level. He developed a vocational interest test with eight occupational keys including electrician, plumber, sheet metal worker, baker, milk-wagon driver, painters, and plasterers. Mosier and Kuder (84), using the *Preference Record—Personal,* investigated 20 occupational groups and found that 15 of the 20 differed on one or more scales. Diamond (27), having noted the increased attention being given to interest tests in industry, emphasized the danger in assuming that a high point in a profile necessarily suggests the appropriate field of specialization. He pointed out that the interpretation depends on the knowledge of the number and kind of people in the occupation. For an occupation with limited numbers, critical scores based on a general population may need to be high.

A number of articles have appeared which deal with the development of a selection battery for particular jobs; however, neither in technic nor in the nature of the job studied, do they appear to be of major significance. Bennett and Cruikshank (7) provided an excellent summary of tests and selection problems in the clerical field.

Ely, Kephart, and Tiffin (36) noted the growing use and significance of the *Ortho-Rater* as an industrial testing instrument. They provided norms for men and women industrial employees and also noted some sex differences. A number of articles on vision in relation to success in a variety of jobs suggest that there has been an increasing awareness of the significance of this factor.

Factor analysis has been increasingly used in industrial studies. Seashore and Dudek (100) analyzed seven tests which were all measures of visual-motor coordination and found that three factors rather than a single steadiness factor were necessary to explain the intercorrelations. Jasper (64) used factor analysis on 20 traits from the *Worker Characteristics Form* of the Occupational Analysis Division of USES. Six factors were found and identified as (a) strength, (b) intelligence, (c) inspection, (d) physically unpleasant working conditions, (e) manual dexterity, and (f) mechanical information. Coombs and Satter (25) computed correlations between jobs based on the common elements of two variables, using job analyses to provide the data. Factor analysis on 20 occupations resulted in finding a first order general factor and four common factors. This study was frankly experimental but the method appears to have possibilities for further development. Barnette (4) suggested another systematic approach to the study of occupational patterns employing either the DuMas (32) coefficient of profile similarity or rank difference correlations. These approaches offer possibility of establishing a limited number of occupational fields on the basis of worker characteristics.

A number of studies employing various personality inventories or projective technics have sought to find reliable personality patterns for job placement, but with uniformly inconclusive results. Ammons and others (3) reported findings using a projective test of vocational attitudes and information which employed plates portraying each occupation. The approach holds some promise of identifying a general attitude toward an occupational area.

Sisson (106) gave an excellent review of the forced choice technic used in the *New Army Rating*. The technic involves the selection by the rater of two responses from a set of four: one being the choice most like the person being rated, and the other the most unlike that person. The four responses include two favorable and two unfavorable responses with only one of each actually being scored. The method is difficult, laborious, and expensive to establish, but its apparent success in overcoming some of the weaknesses of the more common methods makes its further development highly desirable.

Rothe (98), studying the relation of merit ratings and length of service, found no fixed relationship but noted that high positive correlations frequently resulted from lack of cooperation, lack of confidence, or lack of understanding.

Selection and Appraisal of Personnel

This section deals primarily with studies dealing with the selection of executive, managerial, sales, and research personnel. Some overlapping between articles discussed in this and the previous section is inevitable. As in the case of the educational selection and prediction studies, there has been a marked attempt to develop means of study and appraisal of a wide variety of traits of possible significance in success. Less formal and more unstructured technics have received much attention.

Uhrbrock (116) reported on an extensive test development project designed to help in selecting men who have the characteristics of the best of college trained employees. A 100-item test was constructed having a correlation of .48 with order-of-merit rating by executives. Its use was felt to be primarily that of supplementing the judgment of the interviewer.

Husband (63) reviewed the extensive literature from 1935 dealing with the selection of salesmen. He concluded that the weighted scale of personal history data is the most valuable selection technic and that the *Strong Vocational Interest Blank* also has some definite possibilities. He found that interviewing was not generally doing very well but called attention to McMurry's standardized interview as a way of improvement.

Richardson (95), using Strong's weighting chart, devised new scales for the Bernreuter for the purpose of appraising leadership. One scale, thus developed, differentiated between officeholders and nonofficeholders better than any of the Bernreuter scales, altho its correlation of the F1-C scale was greater than the reliability of the latter. Factors differentiating supervisors and nonsupervisors were apparently not as clearly defined. Browne (14) studied executive leadership in business employing the R, A, and D scales introduced by Stogdill and Shartle in their studies of naval leadership. Browne felt that the approach held more possibility of pointing up the importance of social and working relationships in group activities than the customary psychological trait testing method. Attempts to utilize projective technics are typified by Sinaiko's (105) study of the *Rosenzweig Picture Frustration Study* for selection of department store section managers. Extra-punitiveness and ego-defensive scores gave significant negative relationships.

A number of studies dealt with the possibilities of the interview. Wagner's (117) historical summary provided the best single recent discussion. Wagner noted that factors formerly ascertained by interviewing can be better determined by other methods, that the interview can be valid if all possible information is considered and weighted properly.

Kerr and Martin (66) reported on the more systematic use of application blanks and personal history data. They concurred with others in suggesting untapped possibilities in the use of such material as an addition to a predictive test battery. Mandell and Adams (81) found that a biographical information blank offered one of the best possibilities for selection of physical scientists.

Mandell (80) discussed the development and use of a formulation test, involving translation of verbal statements into algebraic equivalents, as a basis for differentiating between research and nonresearch personnel. The test functioned better than any other of an extensive battery investigated. Weislogel (121), using the Flanagan critical requirements approach, developed a test for selection of research personnel or of candidates for advanced training in science and engineering. The report outlined a procedure starting with carefully stated critical requirements in terms of actual behavior and proceeding thru an analysis of elements involved in this behavior to the writing of test items. The limitation to objective testing materials appears slightly unrealistic for adequate sampling of some of the behaviors. In any case, the critical requirements approach, which it exemplifies, appears to be equally applicable to the development of rating scales or more formal testing devices.

Dougan, Schiff, and Welch (31), using the *Welch Reorganization Test* which requires the subject to reorganize familiar ideas according to four different patterns, found a contingency coefficient of .60 between test scores and ratings (by manager and assistant manager) of the originality of department store personnel.

Theoretical Studies. The problem of interpreting test profiles has raised a number of technical or theoretical issues. Bennett and Doppelt (8), using as a criterion the proportion of differences in excess of chance, indicated a method of determining the differential power of two tests employed in combination. The technic is particularly valuable in selecting tests for a profile battery, but awareness of it is also helpful in interpretation. Whiteman (122) argued that the optimum and not the median is the best indicator of potentialities. Large deviations between such potentialities and functional abilities would signalize maladjustments. Altho Whiteman was primarily concerned with the Wechsler-Bellevue, his arguments and methods would seem to have much more general applicability. The work by DuMas (32) on the coefficient of profile similarity has been mentioned. Altho it has not been extensively used thus far, it seems that this coefficient, or some further development of it, has real possibilities in aiding in the study of complete profiles.

Holley and Buxton (60) utilized the Q-technic of Stephenson to analyze the beliefs revealed by a 100-item true-false test of misconceptions. The study was undertaken primarily as a methodological one and it well demonstrates the application of the inverted factor technic as a preliminary step in the selection of items for more elaborate factor analysis studies.

Cattell and others (19) suggested 25 distinct methods of objective measurement of strength of motive, interest, or other dynamic traits. Twelve of these were tried out and the validity of a number of approaches demonstrated. There is an indication that satisfactory attitude measurement may require a battery involving four to six different measuring technics. Edwards and Kilpatrick (34) noted the difficulty involved in selecting the original set of items for scale analysis. A combination of the Thurstone, Likert, and Guttman methods was demonstrated to produce scales of a dozen or more items in which the various statements were still distinctive. The Thurstone approach provided items of suitable range, scoring by the Likert method plus item analysis eliminated nondiscriminating items, and scale analysis was applied to the remaining items.

The classification or categorization of problems is so intimately related to the problem of appraising the individual that the diagnostic categories suggested by Pepinsky (88) must be regarded as a contribution to be listed here. At least five of the eight categories appeared to help in consistent and accurate diagnosis. The real usefulness of these or other such categories in suggesting and selecting suitable therapy has not been investigated.

The observations of Rogers (96) have influenced and undoubtedly will influence thinking and research in the appraisal of individuals. Assuming, as he suggests, that (a) the perceptual field of the individual is the specific determinant of behavior, (b) integration and adjustment are internal conditions related to the degree of acceptance or nonacceptance of perceptions and the degree of organization of these perceptions into a consistent system, (c) the self under proper conditions is capable of reorganizing the perceptual field and thus altering behavior, the further development of individual appraisal procedures would mean minimizing of many of the elaborate psychometric procedures for valuing the individual according to our own frame of reference and a shift from focusing on the fixity of attributes and abilities to study of the extent to which alteration in these qualities is possible.

These viewpoints emphasized the need for a more dynamic concept of appraisal involving collection of evidence on change and possibility of change, rather than status determination. Appraisal technic should help the individual to see himself as he is and as others see him; they should assist him also in comparing what he hopes to become with what it is realistically possible for him to become. Satisfaction and success in the second type of appraisal may depend much more on the first type than our technics have allowed for or even permitted us to determine.

Bibliography

1. ADAMS, MICHAEL, and STUIT, DEWEY B. "The Predictive Efficiency of the 1946 Revision of the Iowa Legal Aptitude Test." *Educational and Psychological Measurement* 9: 23-27; Spring 1949.
2. ALTUS, WILLIAM D. "The Validity of an Abbreviated Information Test Used in the Army." *Journal of Consulting Psychology* 12: 270-75; July 1948.

3. Ammons, Robert B., and others. "Projective Test for Vocational Research and Guidance at the College Level." *Journal of Applied Psychology* 34: 198-205; June 1950.
4. Barnette, W. Leslie, Jr. "Occupational Aptitude Pattern Research." *Occupations* 29: 5-12; October 1950.
5. Barr, Arvil S. "The Measurement and Prediction of Teaching Efficiency, A Summary of Investigations." *Journal of Experimental Education* 16: 203-83; 1948.
6. Bellak, Leopold; Pasquarelli, Blair A.; and Brannerman, Sydell. "The Use of the Thematic Apperception Test in Psychotherapy." *Journal of Nervous and Mental Disease* 110: 51-65; July-December 1949.
7. Bennett, George K., and Cruikshank, Ruth M. *A Summary of Clerical Tests.* New York: Psychological Corporation, 1949. 122 p.
8. Bennett, George K., and Doppelt, Jerome E. "The Evaluation of Pairs of Tests for Guidance Use." *Educational and Psychological Measurement* 8: 319-25; Autumn 1948.
9. Berdie, Ralph F. "Scores on the Strong Vocational Interest Blank and the Kuder Preference Record in Relation to Self-Ratings." *Journal of Applied Psychology* 34: 42-49; February 1950.
10. Blake, Robert R., and McCarty, Billy S. "A Comparative Evaluation of the Bellevue-Wechsler Mental Deterioration Index Distribution of Allen's Brain Injured Patients and of Normal Subjects." *Journal of Clinical Psychology* 4: 415-18; October 1948.
11. Brower, Daniel. "The Relations of Visio-Motor Conflict to Personality Traits and Cardio-Vascular Activity." *Journal of General Psychology* 38: 69-99; January 1948.
12. Brower, Daniel, and Sands, Harvey. "Relations Between Reaction Time and Personal Adjustment as Measured by the Bell Adjustment Inventory." *Journal of General Psychology* 38: 229-33; April 1948.
13. Brown, M. and others. "Personality Factors in Duodenal Ulcer, a Rorschach Study." *Psychosomatic Medicine* 12: 1-5; January-February 1950.
14. Browne, Clarence G. "Study of Executive Leadership in Business—I. The R, A, and D Scales." *Journal of Applied Psychology* 33: 521-26; December 1949.
15. Buck, John N. "The H-T-P Test." *Journal of Clinical Psychology* 4: 151-59; April 1948.
16. Bugental, James F. T., and Zelen, Seymour L. "Investigations Into the 'Self-Concept.' I. The W-A-Y Technique." *Journal of Personality* 18: 483-98; June 1950.
17. Calabresi, Renata A. "Interpretation of Personality With the Szondi Test." *Rorschach Research Exchange* 12: 238-53; 1948.
18. Cattell, Raymond B. "The Main Personality Factors in Questionnaire, Self-Estimate Material." *Journal of Social Psychology* 31: 3-8; 1950.
19. Cattell, Raymond B., and others. "The Objective Measurement of Dynamic Traits." *Educational and Psychological Measurement* 10: 224-48; Summer 1950.
20. Cillis, Olga E., and Orbison, William D. "A Comparison of the Terman-Miles M-F Test and the Mf Scale of the MMPI." *Journal of Applied Psychology* 34: 338-41; October 1950.
21. Clark, Jerry H. "Additional Applications of the Altus Thirty-Six Point Adjustment Test as a Screening Instrument." *Journal of General Psychology* 40: 261-65; April 1949.
22. Clark, Jerry H. "Clinical Use of the Altus Thirty-Six Point Adjustment Test in Screening Army A.W.O.L's." *Journal of Consulting Psychology* 12: 276-79; July 1948.
23. Clark, Jerry H. "Interest Variability on the California Test of Mental Maturity in Relation to the Minnesota Multiphasic Personality Inventory." *Journal of Consulting Psychology* 14: 32-34; February 1950.
24. Clark, Kenneth E. "A Vocational Interest Test at the Skilled Trades Level." *Journal of Applied Psychology* 33: 291-303; 1949.
25. Coombs, Clyde H., and Satter, George A. "A Factorial Approach to Job Families." *Psychometrika* 14: 33-42; March 1949.
26. Deabler, Herdis L. "The Psychotherapeutic Use of the Thematic Apperception Test." *Journal of Clinical Psychology* 3: 246-57; July 1947.

27. Diamond, Solomon. "Interpretation of Interest Profiles." *Journal of Applied Psychology* 32: 512-20; October 1948.
28. DiVesta, Francis J.; Woodruff, Aschel D.; and Hestil, John P. "Motivation as a Predictor of College Success." *Educational and Psychological Measurement* 9: 339-48; Autumn 1949.
29. Donceel, Joseph F.; Alimena, Benjamin S.; and Birch, Catherine M. "Influence of Prestige Suggestion on the Answers of a Personality Inventory." *Journal of Applied Psychology* 33: 352-55; August 1949.
30. Dorkey, Margaret, and Amen, Elizabeth W. "A Continuation Study of Anxiety Reactions in Young Children by Means of a Projective Technique." *Genetic Psychology Monographs* 35: 139-83; 1947.
31. Dougan, Catherine P.; Schiff, Ethel; and Welch, Livingston. "Originality Ratings of Department Store Display Department Personnel." *Journal of Applied Psychology* 33: 31-35; February 1949.
32. DuMas, Frank M. "The Coefficient of Profile Similarity." *Journal of Clinical Psychology* 5: 123-313; April 1949.
33. Dymond, Rosalind F. "The Measurement of Emphatic Ability." *Journal of Consulting Psychology* 13: 127-33; April 1949.
34. Edwards, Allen L., and Kilpatrick, Franklin P. "Scale Analysis and the Measurement of Social Attitudes." *Psychometrika* 13: 99-114; June 1948.
35. Ellis, Albert. "A Comparison of the Use of Direct and Indirect Phrasing in Personality Questionnaires." *Psychological Monographs* 61: 1-41; 1947.
36. Ely, J. H.; Kephart, N. C.; and Tiffin, Joseph. "Ortho-Rater Norms and Sex Differences." *Journal of Applied Psychology* 34: 232-34; August 1950.
37. Falls, Robert P., and Blake, Robert R. "A Quantitative Analysis of the Picture-Frustration Study." *Journal of Personality* 16: 320-25; March 1947.
38. Fehrer, Elizabeth, and Strupp, Hans. "The Effect of Equating Interest Test Items for Prestige Value." *Journal of Applied Psychology* 33: 222-30; June 1949.
39. Fowler, Hanford M. "The Consistency of the Items of an Activity Preference Blank." *Psychometrika* 12: 221-32; September 1947.
40. French, John W. "The Validity of a Persistence Test." *Psychometrika* 13: 271-77; December 1948.
41. Gildea, Edwin F. "Special Features of Personality Which Are Common to Certain Psychosomatic Disorders." *Psychosomatic Medicine* 11: 273-82; October 1949.
42. Goldfarb, William. "Rorschach Test Differences Between Family-Reared, Institution-Reared, and Schizophrenic Children." *American Journal of Orthopsychiatry* 18: 624-33; October 1949.
43. Gordon, Leonard V. "The Reflection of Problem Changes." *Educational and Psychological Measurement* 9: 749-56; Winter 1949.
44. Gough, Harrison G. "A Short Social Status Inventory." *Journal of Educational Psychology* 40: 52-56; January 1949.
45. Gough, Harrison G. "The Frame of Reference of the Thematic Apperception Test." *Journal of Clinical Psychology* 4: 90-92; January 1948.
46. Gough, Harrison G., and others. "Children's Ethnic Attitudes: I. Relationship to Certain Personality Factors." *Child Development* 21: 83-91; June 1950.
47. Grossman, Beverly, and Wrighter, Joyce. "The Relationship Between Selection-Rejection and Intelligence, Social Status and Personality Amongst Sixth Grade Children." *Sociometry* 11: 346-55; November 1948.
48. Guilford, Joy P., and Zimmerman, Wayne S. "The Guilford-Zimmerman Aptitude Survey." *Journal of Applied Psychology* 32: 24-34; February 1948.
49. Gurovitz, Milton S. "The Intelligence Factor in Psychopathic Personality." *Journal of Clinical Psychology* 3: 194-96; April 1947.
50. Hadley, John M., and Kennedy, Vera E. "A Comparison Between Performance on a Sentence Completion Test and Academic Success." *Educational and Psychological Measurement* 9: 649-70; Winter 1949.
51. Haire, Mason, and Gottsdanker, Josephine S. "Worker Adjustment as Studied by Projective and Interviewing Techniques." *American Psychologist* 4: 262; July 1949.
52. Hake, Dorothy T., and Ruedisili, Chester H. "Predicting Subject Grades of Liberal Arts Freshmen with the Kuder Preference Record." *Journal of Applied Psychology* 33: 553-58; December 1949.

53. Hall, Calvin S. "Diagnosing Personality by the Analysis of Dreams." *Journal of Abnormal and Social Psychology* 42: 68-79; 1947.
54. Harris, Frank J. "The Quantification of an Industrial Employee Survey: I. Method, II. Application." *Journal of Applied Psychology* 33: 103-13; April 1949.
55. Harrower, Molly R. "The Most Unpleasant Concept Test." *Journal of Clinical Psychology* 6: 213-33; July 1950.
56. Hawkes, Glenn R. "Use of the Minnesota Multiphasic Personality Inventory in Screening College Students for Counseling Purposes." *Journal of Educational Psychology* 41: 116-21; February 1950.
57. Hertzman, Max, and Pearce, Jane. "The Personal Meaning of the Human Figure in the Rorschach." *Psychiatry* 10: 413-22; November 1947.
58. Hertzman, Max; Smith, Milton G.; and Clark, Kenneth B. "The Relation Between Changes in the Angioscotoma and Certain Rorschach Signs Under Prolonged Mild Anoxia." *Journal of General Psychology* 41: 263-71; July 1949.
59. Heston, Joseph C. "A Comparison of Four Masculinity-Feminity Scales." *Educational and Psychological Measurement* 8: 375-87; Autumn 1948.
60. Holley, J. W., and Buxton, Claude E. "A Factorial Study of Beliefs." *Educational and Psychological Measurement* 10: 400-10; Autumn 1950.
61. Holzberg, Jules D., and Alessi, Salvatore. "Reliability of the Shortened Minnesota Multiphasic Personality Inventory." *Journal of Consulting Psychology* 13: 288-92; August 1949.
62. Hunt, William A., and French, Elizabeth G. "Some Abbreviated Individual Intelligence Scales Containing Non Verbal Items." *Journal of Consulting Psychology* 13: 119-23; April 1949.
63. Husband, Richard W. "Techniques of Salesman Selection." *Educational and Psychological Measurement* 9: 129-48; Summer 1949.
64. Jasper, Nathan. "A Factor Study of Worker Characteristics." *Journal of Applied Psychology* 33: 449-59; October 1949.
65. Kadis, Asya L., and Lazarsfield, Sofie. "The Respective Roles of 'Earliest Recollections' and 'Images'." *American Journal of Psychotherapy* 2: 250-56; April 1948.
66. Kerr, Willard A., and Martin, Horace L. "Prediction of Job Success from the Application Blank." *Journal of Applied Psychology* 33: 442-44; October 1949.
67. Kimber, Morris J. H. "The Insight of College Students Into the Items on a Personality Test." *Educational and Psychological Measurement* 7: 411-18; Autumn 1947.
68. Klein, George S. "An Application of the Multiple Regression Principle to Clinical Prediction." *Journal of General Psychology* 38: 159-79; April 1948.
69. Kleist, Mydelle; Ritterhouse, C. H.; and Farnsworth, Paul R. "Strong Vocational Interest Scales for Music Teachers." *Occupations* 28: 100-101; November 1949.
70. Kofka, John S., and Bolger, Hedda. "Notes on the Clinical Uses of Future Autobiographies." *Rorschach Research Exchange* 13: 341-46; September 1949.
71. Kogan, William Sanford. "An Investigation into the Relationship Between Psychometric Patterns and Psychiatric Diagnosis." *Journal of General Psychology* 43: 17-45; July 1950.
72. Kreidt, Philip H. "Vocational Interests of Psychologists." *Journal of Applied Psychology* 33: 482-88; October 1949.
73. Lazarus, Richard S. "An Experimental Analysis of the Influence of Color on the Protocol of the Rorschach Test." *Journal of Personality* 17: 182-85; December 1948.
74. Lehner, George F. J., and Silver, Hyman. "Age Relationships on the Draw-A-Person Test." *Journal of Personality* 17: 199-209; December 1948.
75. Lord, Frederic; Cowles, John T.; and Cynamon, Manual. "The Pre-Engineering Inventory as a Predictor of Success in Engineering Colleges." *Journal of Applied Psychology* 34: 30-39; February 1950.
76. Lovell, George D.; Laurie, Gloria; and Marvin, Doris. "A Comparison of the Minnesota Personality Scale and the Bell Adjustment Inventory for

Student Counseling." *Proceedings.* Ames: Iowa Academy of Science (Iowa State College), 1947. p. 247-51.

77. MCCURDY, HAROLD G. "Basal Metabolism and Academic Performance in a Sample of College Women." *Journal of Educational Psychology* 38: 363-71; October 1947.
78. MCCURDY, HAROLD G. "Group and Individual Variability on the Goodenough Draw-A-Man Test." *Journal of Educational Psychology* 38: 428-36; November 1947.
79. MCQUITTY, LOUIS L. "Diversity of Self Endorsements as a Measure of Individual Differences in Personality." *Educational and Psychological Measurement* 9: 3-14; Spring 1949.
80. MANDELL, MILTON M. "Measuring Originality in the Physical Sciences." *Educational and Psychological Measurement* 10: 380-85; Autumn 1950.
81. MANDELL, MILTON, and ADAMS, SIDNEY. "Selection of Physical Scientists." *Educational and Psychological Measurement* 8: 575-81; Winter 1948.
82. MARTIN, GLENN C. "A Factor Analysis of the Bernreuter Personality Interview." *Educational and Psychological Measurement* 8: 85-92; Spring 1948.
83. MORRIS, WOODROW W., and NICHOLAS, ALMA L. "Intrafamilial Personality Configurations Among Children with Primary Behavior Disorders and Their Parents, A Rorschach Investigation." *Journal of Clinical Psychology* 6: 309-19; October 1950.
84. MOSIER, MARY F., and KUDER, G. FREDERIC. "Personal Preference Differences Among Occupational Groups." *Journal of Applied Psychology* 33: 231-39; June 1949.
85. OSBORNE, R. TRAVIS; SANDERS, WILMA B.; and GREENE, JAMES E. "The Differential Prediction of College Marks by ACE Scores." *Journal of Educational Research* 44: 107-15; October 1950.
86. OSBORNE, R. TRAVIS, and SANDERS, WILMA B. "Multiple-Choice Rorschach Responses of College Achievers and Non-Achievers." *Educational and Psychological Measurement* 9: 685-91; Winter 1949.
87. OSTROM, STANLEY R. "The OL Key of the Strong Vocational Interest Blank for Men and Scholastic Success at the College Freshmen Level." *Journal of Applied Psychology* 33: 51-54; February 1949.
88. PEPINSKY, HAROLD B. "The Selection and Use of Diagnostic Categories in Clinical Counseling." *Applied Psychology Monograph* No. 15. Stanford, Calif.: Stanford University Press, 1948. 140 p.
89. POWELL, MARGARET, "Comparisons of Self-Ratings, Peer-Ratings and Experts-Ratings of Personality Adjustment." *Educational and Psychological Measurement* 8: 225-34; Summer 1948.
90. PRADOS, MIGUEL, and FRIED, ERDITA G. "Personality Structure of the Older Age Groups." *Journal of Clinical Psychology* 3: 113-20; April 1947.
91. RAUSCH, OSCAR P. "The Effects of Individual Variability on Achievement." *Journal of Educational Psychology* 39: 469-78; December 1948.
92. REICHENBERG-HACKETT, WALLY. "The Geosign Test: A Semistructured Drawing Situation Utilized as a Screening Test for Adjustment." *American Journal of Orthopsychiatry* 20: 578-94; July 1950.
93. REMMERS, HERMANN H. "A Quantitative Index of Social-Psychological Empathy." *American Journal of Orthopsychiatry* 20: 161-65; January 1950.
94. REMMERS, HERMANN H., and GAGE, NATHANIEL L. "The Abilities and Interests of Pharmacy Freshmen." *American Journal of Pharmaceutical Education* 12: 5-65; January 1948.
95. RICHARDSON, HELEN M. "Adult Leadership Scales Based on the Bernreuter Personality Inventory." *Journal of Applied Psychology* 32: 292-303; June 1948.
96. ROGERS, CARL R. "Some Observations on the Organization of Personality." *American Psychologist* 2: ; September 1947.
97. ROSENZWEIG, SAUL, and ISHAM, A. C. "Complementary Thematic Apperception Test Patterns in Close Kin." *American Journal of Orthopsychiatry* 17: 129-42; January 1947.
98. ROTHE, HAROLD F. "The Selection of Merit Ratings to Length of Service." *Personnel Psychology* 2: 237-42; Summer 1949.
99. SCHOFIELD, WILLIAM. *Changes in Responses to the Minnesota Multiphasic Inventory Following Certain Therapies.* Psychological Monographs Vol. 64,

No. 5. Washington, D. C.: American Psychological Association, 1950. 33 p.

100. Seashore, Robert H., and Dudek, Frank J. "A Factorial Analysis of Arm-Hand Precision Tests." *American Psychologist* 3: 252-53; July 1948.
101. Seeman, Julius. "A Study of Client Self-Selection of Tests in Vocational Counseling." *Educational and Psychological Measurement* 8: 327-46; Autumn 1948.
102. Sen, Amya. "A Statistical Study of the Rorschach Test." *British Journal of Psychology, Statistical Section* 3: 21-39; March 1950.
103. Sheerer, Elizabeth T. "An Analysis of the Relationship Between Acceptance of and Respect for Self and Acceptance of and Respect for Others in Ten Counseling Cases." *Journal of Consulting Psychology* 13: 169-75; June 1949.
104. Shoben, Edward J. "The Wechsler-Bellevue in the Detection of Anxiety: A Test of the Rashkis-Welsh Hypothesis." *Journal of Consulting Psychology* 14: 40-45; February 1950.
105. Sinaiko, Wallace H. "The Rosenzweig Picture-Frustration Study in the Selection of Department Store Section Managers." *Journal of Applied Psychology* 33: 36-42; February 1949.
106. Sisson, Donald E. "Personnel Research, A. G. O., U. S. Army, The New Army Rating." *Personnel Psychology* 1: 365-82; Autumn 1948.
107. Stafford, John W., and Hsu, En-hsi. "The Super-Factor of Persons." *Journal of Psychology* 24: 63-70; July 1947.
108. Stein, Morris I. "Personality Factors Involved in the Temporal Development of Rorschach Responses." *Rorschach Research Exchange* and *Journal of Projective Techniques* 13: 355-414; December 1949.
109. Stone, Calvin P., editor. *Annual Review of Psychology*. Stanford, Calif.: Annual Reviews, 1950.
110. Strong, Edward K., Jr. "Vocational Interests of Accountants." *Journal of Applied Psychology* 33: 474-81; October 1949.
111. Stuit, Dewey B. "Construction and Educational Significance of Aptitude Tests." *Review of Educational Research* 20: 27-37; February 1950.
112. Stuit, Dewey B. "The Discovery of Medical Talent." *Journal of Association of American Medical Colleges* 23: 157-62; 1948.
113. Symonds, Percival M. "Release of Repressed Tendencies." *American Journal of Orthopsychiatry* 17: 404-15; July 1947.
114. Tate, Merle W. "Individual Differences in Speed of Response in Mental Test Materials of Varying Degrees of Difficulty." *Educational and Psychological Measurement* 8: 353-74; Autumn 1948.
115. Travers, Robert M. W., and Wallace, Winburn L. "The Assessment of the Academic Aptitude of the Graduate Student." *Educational and Psychological Measurement* 10: 371-79; Autumn 1950.
116. Uhrbrock, Richard S. "Construction of a Selection Test for College Graduates." *Journal of General Psychology* 41: 153-93; July 1949.
117. Wagner, Ralph. "A Group Situation Compared with Individual Interviews for Securing Personnel Information." *Personnel Psychology* 1: 93-107; Spring 1948.
118. Wallace, Winburn L. "Differential Predictive Value of the ACE Psychological Examination." *School and Society* 70: 23-25; July 9, 1949.
119. Wechsberg, Florence O., and Sparer, Phineas J. "A Statistical and Profile Comparison of a Hospitalized Tuberculous Group with a Normal College Group Using the Cornell Index." *Journal of Clinical Psychology* 4: 63-69; January 1948.
120. Weinland, James D. "The Use of Rating Scales and Personal Inventories to Check Each Other." *Journal of Applied Psychology* 32: 631-35; December 1948.
121. Weislogel, Mary H. *The Development of a Test for Selecting Research Personnel.* American Institute for Research. Pittsburgh: the Institute, 1950. 33 p.
122. Whiteman, Mordecai. "Attitude as a Reference Point in Scatter Analysis." *Journal of Clinical Psychology* 6: 160-64; April 1950.
123. Wiener, Daniel N., and Phillips, E. Lakin. "A Study of Progress in Psychotherapy." *Journal of Clinical Psychology* 4: 201-206; April 1948.
124. Wittenborn, John R. "Certain Rorschach Response Categories and Mental Abilities." *Journal of Applied Psychology* 33: 330-38; August 1949.
125. Young, Leil L. "Sociometric and Related Techniques for Appraising Social Status in Elementary Schools." *Sociometry* 10: 168-77; May 1947.

CHAPTER V

Counseling

JOHN W. M. ROTHNEY and PAUL J. DANIELSON

AN EXAMINATION of the literature of the period under review indicates that the definition of counseling used in the last REVIEW on this topic has been accepted with slight modification. As used here it refers to the "face-to-face relationship in which a trained individual is consciously attempting by verbal means to assist another person to modify attitudes or other behavior with respect to educational, emotional, and vocational issues." If this summary were limited to completed reports of research in counseling it would be very brief. Most of the literature is still restricted to debates concerning theory and methods, descriptions of programs in operation, and general treatises on the counseling process. They have been noted in this chapter, however, because they contain hints, clues, and suggestions for research.

Eight textbooks purporting to describe the objectives and processes of counseling have been published during the period under review. Arbuckle (5) contrasted directive and nondirective procedures effectively thru sample interviews. Cassidy and Kozman (9) indicated the need for special procedures because of the changing status of women. Erickson (14) presented practical suggestions for conducting the counseling interview. Hamrin and Paulson (20) emphasized the eclectic approach previously urged by Rothney and Roens (39) and considered the interview as a learning situation. Robinson (34) presented many data from analysis of interviews. Rothney and Roens (39), considering the counselee in the dynamics of specific situations rather than in some general frame of reference, urged the eclectic approach and presented follow-up data. Williamson's (53) text was concerned primarily with the counseling of college students. These volumes reflected many viewpoints about theory and method but, except in rare instances, outlined in opinion much of what must still be established by research.

Reports of Research

Most research in counseling has been confined to the study of single variables treated by cross-sectional methods with limited populations. Two major exceptions are the studies directed by Rogers (37) at Chicago and the pioneer longitudinal study by Rothney and Roens (40) at Harvard.

Grummon and Gordon (18) described the facilities, training, service, and research possibilities of the Chicago Counseling Center and concluded that the successful work there could be attributed to the consistency of application of nondirective counseling. Sheerer (44) found that counselee's evaluation of themselves and of their worth as persons could be changed significantly by therapy. Stock (45) showed, by study of the statements of 10 clients, that as their feelings about themselves changed, their feelings about others changed in similar directions. Haigh (19) studied the correlation between defensive behavior expressed in counseling and elsewhere. Altho some clients showed an increase in defensiveness, most showed a decrease. Hoffman (23) classified "reported past behavior" and "reported planned behavior" into different levels of maturity and found that there was little improvement in maturity from first to the last third of therapy. Differences in maturity between the five most and five least successfully treated cases were statistically significant. All of these Chicago studies revealed that there were still problems which clinicians have not yet solved. When they treat their counselees fully they do not have time to work with enough cases to satisfy the statisticians. When they work with a large number of cases they do not have time to treat them fully enough from the clinical point of view.

The only study of counseling reported during the period under review which used longitudinal and follow-up methods with a statistically adequate population was that by Rothney and Roens (40). Altho they worked with 825 subjects for various lengths of time during the course of their study, they attempted evaluation of continuous counseling of only those 129 subjects who had been counseled for the five years in which they attended Grades VIII to XII in a typical high school. Evaluation of counseling was made by comparing the high-school and post-high-school performances of the counseled subjects with control group students who had been matched on eight variables. Since both experimental and control groups attended the same school, other variables operated during the study, but results were interpreted only in terms of the effects of the individual counseling provided. The authors reported: (a) significant differences between the experimental and control groups of students in terms of academic achievement while in high school; (b) more employment among noncollege guided groups; (c) more definiteness concerning vocational plans and means of attaining them; (d) better adjustment on the job or in post-high-school training; (e) greater awareness of educational problems; and (f) better information on how to meet problems and where to seek advice. They concluded that counseling of youth can contribute significantly to the accomplishment of the objectives of the secondary school. President Conant of Harvard contributed a penetrating analysis of counseling problems to the report which suggests the need of additional research.

Directive Versus Nondirective Counseling

The pendulum which had swung so vigorously toward nondirective counseling during the past 10 years seems now to be swinging back to near center. Rogers (36, 38) reiterated the values of nondirective therapy and extended the theory to include treatment for intergroup tensions. Rogers also summarized the results of a study of 37 client evaluations of nondirective psychotherapy by Lipkin (28). He suggested that clients were taking responsibility for their actions, that they were getting a clearer understanding of themselves, and that other evidence suggested that client's evaluations were consistent with the theory of nondirective counseling. Miller (30) obtained from four judges the classifications of responses in directive and nondirective interviews as evidence of counselors' accepting, supporting, denying, or neutral attitudes toward clients' positions. Counselors who used directive methods were characterized by accepting, rather than neutral attitudes. Cowen and Combs (11) suggested that validation of results of nondirective counseling cannot be determined immediately after completing therapy and they followed up 32 subjects for an average of 20 months following treatment. Sixty percent said that treatment gains were almost complete while 90 percent claimed to have received help. Prognoses before therapy checked with follow-up evaluation in 60 percent of the cases.

Hardy (21) found no significant relationship between dominance and nondirectiveness in counseling. Carr's (8) attempt to evaluate nondirective therapy by giving the Rorschach before and after therapy showed no consistent qualitative or quantitative differences. Carnes and Robinson (7) used a ratio of client talk to total talk in 78 interviews with college students in a how-to-study course. They found, by computing the correlation between their ratios and effectiveness in counseling as measured by counselee insight, working relationship, and client responsibility for progress of the interview, that the ratio of client talk cannot be used as a criterion of counseling effectiveness. Ellis (13) suggested that nondirective counseling is an old and familiar concept rather than a new viewpoint. Thorne (48) indicated that directive therapy operates in a specific manner to facilitate insight and does not violate the client-centered principle. Thorne (49) further proposed that it was time to abandon attempts to establish schools or systems in favor of the genuinely eclectic approach. Hunt (25) questioned the use of nondirective therapy and decried the lack of training in diagnosis for nondirective therapists. The last review on counseling indicated that it was time to take stock of the values of different methods. This caution should be repeated here. A start has been made.

Research Problems and Methods

Examination of research studies in counseling, directed particularly toward the variables which researchers must consider, suggests that there is need for studies which will outline designs for further experimentation. The following studies point up some of these needs. Grant and Grant (17) examined the problems of "therapy readiness" in a preliminary way. Abt (1) described a method of quantifying interview material by forming hypotheses, setting up interviews to test them, and analyzing them separately according to a checklist. Kaufman and Raimy (26) asked three judges to score 17 interviews for the Discomfort-Relief Quotient of Dollard and Mowrer and three other judges to score the interviews to get a quotient for positive, negative, or ambivalent self-reference. Both methods gave indications of personality changes. The first quotient stressed reduction of tensions while the latter stressed the self-concept. Raimy (33) quantified analyses of changes in self-approval in complete series of interviews of 14 college students. In successful cases there was change from ambivalence or self-disapproval to self-approval. He concluded that his findings were in line with the hypothesis that successful counseling involves essentially a change in clients' self-concepts. Pepinsky (31) studied the use of diagnostic categories in counseling and found, tentatively, that five of eight categories (lack of assurance, lack of information, lack of skill, interpersonal self-conflict, and intrapersonal self-conflict), led to consistent and accurate diagnosis. Pepinsky (32) also described a method of applying informal projective methods to the interview by directing the clients' attention to lithographs in the manner of the Rorschach. Horrocks and Nagy (24) used an artificial case study with groups of varying degrees of education and experience to show that diagnosis and therapy are separate abilities.

Evaluation of Counseling

Several authors have pointed out the difficulties researchers meet when they attempt to evaluate the counseling process. Hathaway (22) indicated that there are problems of determining *when* counseling becomes therapy, *what* measures can be used to determine changes in behavior, and *how* to determine differences between the effects of common intrapersonal and counseling relationships. Shaffer (43) commented that psychotherapy gives significant help to only 40 to 60 percent of the clients and suggested that earlier and even current explanations of psychotherapy are not adequate for the needs of research, discovery, and development. Roe (35) suggested that personality must become more related to clinical practice. Williamson (54) presented six criteria of good and bad counseling. Froelich (16) studied the analysis of case folder data and the follow-up methods of evaluation. Travers (50) reviewed critically the common technics for evaluating counseling and suggested that the outcomes should be measured in terms of criteria similar to those noted by Williamson (54). Stromswold and Wrenn (47) defined five diagnostic categories of scholastic adjustment on which counseling could be done and on which the effectiveness of counseling could be measured.

As with most studies in psychology the availability of subjects seems to have determined their selection. College students have been used largely in the studies reported above and in the following evaluations of counseling. Webb (52) showed that 241 college students believed that vocational counseling had been of some help. Aldrich (3) revealed that college girls who had received social counseling exceeded others in: (a) number of contacts with the counseling bureau; (b) number of activities, committees, and offices; (c) percentage graduate; and (d) less severe diagnosis for those who visited a mental hygiene clinic. Stone (46) found that, unless students enrolled in a vocational orientation course were given individual counseling, the courses were not helpful. The courses served as preparation for individual counseling and reduced the time necessary for it. Kirchheimer (27) showed that veterans in college who had been counseled concerning major subjects improved their grade-point averages. Seeman (42) found no relationship between counseling methods and client reaction to counseling. Reactions were determined by personal qualities of counselors such as warmth and interest.

In addition to the evaluation of high-school counseling reported by Rothney and Roens (40) above, two attempts at that level have been reported. Young (57) described the four-year research program of the Evanston Township (Illinois) High School and Barber (6), who made a follow-up study of the graduates of East Aurora (New York) High School, reported that the school had been improved thru the work of the counselors.

Of evaluation studies in other than academic situations the Veterans Administration reports are most common. Failor and Isaacson (15) obtained questionnaire responses of veterans who were counseled in 1945-47. They felt that the counseling was ably and professionally handled and of considerable value to them. A report of a questionnaire study made by the Veterans Administration (51) indicated that 71 to 84 percent of the veterans were satisfied with counseling received and a significant relationship between success in training and work in the employment objective selected during counseling was found.

Probable Trends

Several symposia and individual reports suggested directly, or by implication, the research studies which must be undertaken. Donahue (12) compiled the writings of 15 authors prominent in the field of guidance and measurement and noted the trends in student personnel work with respect to programs and research. Lloyd-Jones (29) listed 15 fundamental questions with respect to a coordinated counseling program dealing with every child of every age level as a whole person. Aiken (2) listed the problems of definition of counseling, its processes, its staff, and the need for its evaluation as those in which research is needed. Sanford (41), summarizing a symposium on psychotherapy and counseling, indicated that the two basic questions for which answers are needed are those concerning the nature of the changes that take place during therapy and the conditions under which they are likely to occur.

One report which warrants special attention is that of Corey (10) on two kinds of research. He described the difference between the "fundamental" researcher who searches for the ultimate truth and the "action" researcher who is interested primarily in the improvement of current educational practices. Since, as Wright and Darley (56) have indicated, there is a great increase in the demand for counseling and since, as they have pointed out, an extensive literature on counseling is developing which is not based on research, there is need for all counselors to consider Corey's admonition to get more "action" in research.

Rothney and Roens (39) suggested in 1949 that counseling was a disordered field and that its current status depended on faith rather than upon demonstrated accomplishment. The willingness of its practitioners to embark upon a course of thoro self-analysis and self-appraisal will determine its future. There appears to be no need currently to change that opinion.

Bibliography

1. ABT, LAURENCE E. "The Analysis of Structured Clinical Interviews." *Journal of Clinical Psychology* 5: 364-70; October 1949.
2. AIKEN, DURWARD W. "Counseling." *Current Trends in Higher Education, 1949.* Official Group Report of the Fourth Annual National Conference on Higher Education. Washington, D. C.: Department of Higher Education, National Education Association, 1949. p. 19-25.
3. ALDRICH, MARGARET G. "A Follow-Up Study of Social Guidance at the College Level." *Journal of Applied Psychology* 33: 258-64; June 1949.
4. ANDERSON, ROSE G. "Preferred Ages for Vocational Counseling." *Occupations* 27: 77-81; November 1948.
5. ARBUCKLE, DUGALD S. *Teacher Counseling.* Cambridge, Mass.: Addison-Wesley Press, 1950. 178 p.
6. BARBER, JOSEPH E. *Evaluating School Guidance.* Buffalo: Foster and Stewart, 1946. 102 p.
7. CARNES, EARL F., and ROBINSON, FRANCIS P. "The Role of Client Talk in the Counseling Interview." *Educational and Psychological Measurement* 8: 635-44; Winter 1948.
8. CARR, ARTHUR C. "An Evaluation of Nine Non-Directive Psychotherapy Cases by Means of Rorschach." *Journal of Consulting Psychology* 13: 196-205; June 1949.
9. CASSIDY, ROSALIND, and KOZMAN, HILDA C. *Counseling Girls in a Changing Society.* New York: McGraw-Hill Book Co., 1947. 441 p.
10. COREY, STEPHEN M. "Action Research, Fundamental Research, and Educational Practices." *Teachers College Record* 50: 509-14; May 1949.
11. COWEN, EMORY L., and COMBS, ARTHUR W. "Follow-Up Study of Thirty-Two Cases Treated by Nondirective Psychotherapy." *Journal of Abnormal and Social Psychology* 45: 232-58; April 1950.
12. DONAHUE, WILMA T., and OTHERS. *The Measurement of Student Adjustment and Achievement.* Ann Arbor: University of Michigan Press, 1949. 256 p.
13. ELLIS, ALBERT. "A Critique of the Theoretical Contributions of Non-Directive Therapy." *Journal of Clinical Psychology* 4: 248-55; July 1948.
14. ERICKSON, CLIFFORD E. *The Counseling Interview.* New York: Prentice Hall, 1950. 174 p.

15. FAILOR, CLARENCE W., and ISAACSON, LEE E. "The Veteran Evaluates Counseling." *Occupations* 28: 18-24; October 1949.
16. FROELICH, CLIFFORD P. *Factors Related to the Effectiveness of Counseling.* Doctor's thesis. Washington, D. C.: George Washington University, 1948. 238 p.
17. GRANT, J. DOUGLAS, and GRANT, MARGARET Q. " 'Therapy Readiness' as a Research Variable." *Journal of Consulting Psychology* 14: 156-57; April 1950.
18. GRUMMON, DONALD L., and GORDON, THOMAS. "The Counseling Center at the University of Chicago." *American Psychologist* 3: 166-71; May 1948.
19. HAIGH, GERARD. "Defensive Behavior in Client-Centered Therapy." *Journal of Consulting Psychology* 13: 181-89; June 1949.
20. HAMRIN, SHIRLEY A., and PAULSON, BLANCHE B. *Counseling Adolescents.* Chicago: Science Research Associates, 1950. 371 p.
21. HARDY, VIRGINIA T. "Relation of Dominance to Non-Directiveness in Counseling." *Journal of Clinical Psychology* 4: 300-303; July 1948.
22. HATHAWAY, STARKE R. "Some Considerations Relative to Non-Directive Counseling as Therapy." *Journal of Clinical Psychology* 4: 226-31; July 1948.
23. HOFFMAN, A. EDWARD. "A Study of Reported Behavior Changes in Counseling." *Journal of Consulting Psychology* 13: 190-95; June 1949.
24. HORROCKS, JOHN E., and NAGY, GEORGE. "The Relationship Between the Ability To Make a Diagnosis and To Select Appropriate Remedial Procedures." *Journal of General Psychology* 38: 139-46; April 1948.
25. HUNT, WILLIAM A. "Diagnosis and Non-Directive Therapy." *Journal of Clinical Psychology* 4: 232-36; July 1948.
26. KAUFMAN, PAUL E., and RAIMY, VICTOR C. "Two Methods of Assessing Therapeutic Progress." *Journal of Abnormal and Social Psychology* 44: 379-85; July 1949.
27. KIRCHHEIMER, BARBARA A., and OTHERS. "An Objective Evaluation of Counseling." *Journal of Applied Psychology* 33: 249-57; June 1949.
28. LIPKIN, STANLEY. "The Client Evaluates Nondirective Psychotherapy." *Journal of Consulting Psychology* 12: 137-46; May 1948.
29. LLOYD-JONES, ESTHER. "Some Current Issues in Guidance." *Teachers College Record* 49: 77-88; November 1947.
30. MILLER, HELEN E. " 'Acceptance' and Related Attributes as Demonstrated in Psychotherapeutic Interviews." *Journal of Clinical Psychology* 5: 83-88; January 1949.
31. PEPINSKY, HAROLD B. *The Selection and Use of Diagnostic Categories in Clinical Counseling.* Applied Psychology Monographs, No. 15. Stanford, Calif.: Stanford University Press, 1948. 140 p.
32. PEPINSKY, HAROLD B. "Application of Informal Projective Methods Into the Counseling Interview." *Educational and Psychological Measurement* 7: 135-40; Spring 1947.
33. RAIMY, VICTOR C. "Self Reference in Counseling Interviews." *Journal of Consulting Psychology* 12: 153-63; May 1948.
34. ROBINSON, FRANCIS P. *Principles and Procedures in Student Counseling.* New York: Harper and Brothers, 1950. 321 p.
35. ROE, ANNE. "Integration of Personality Theory and Clinical Practice." *Journal of Abnormal and Social Psychology* 44: 36-41; January 1949.
36. ROGERS, CARL R. "The Attitude and Orientation of the Counselor in Client-Centered Therapy." *Journal of Consulting Psychology* 13: 82-94; April 1949.
37. ROGERS, CARL R. "A Coordinated Research in Psychotherapy; A Non-Objective Introduction." *Journal of Consulting Psychology* 13: 149-53; June 1949.
38. ROGERS, CARL R. *Dealing with Social Tensions: A Presentation of Client-Centered Counseling as a Means of Handling Interpersonal Conflict.* New York: Hinds, Hayden, and Eldredge, 1948. 30 p.
39. ROTHNEY, JOHN W. M., and ROENS, BERT A. *Counseling the Individual Student.* New York: William Sloane Associates, 1949. 364 p.
40. ROTHNEY, JOHN W. M., and ROENS, BERT A. *Guidance of American Youth.* Cambridge, Mass.: Harvard University Press, 1950. 269 p.
41. SANFORD, R. NEVITT. "Psychotherapy and Counseling: A Symposium." *Journal of Consulting Psychology* 12: 65-67; March 1948.
42. SEEMAN, JULIUS. "An Investigation of Client Reactions to Vocational Counseling." *Journal of Consulting Psychology* 13: 95-104; April 1949.

43. SHAFFER, LAURANCE F. "The Problem of Psychotherapy." *American Psychologist* 2: 459-67; November 1947.
44. SHEERER, ELIZABETH T. "An Analysis of the Relationship Between Acceptance of and Respect for Self and Acceptance of and Respect for Others in Ten Counseling Cases." *Journal of Consulting Psychology* 13: 169-75; June 1949.
45. STOCK, DOROTHY. "An Investigation Into the Interrelations Between the Self Concept and Feelings Directed Toward Other Persons and Groups." *Journal of Consulting Psychology* 13: 176-80; June 1949.
46. STONE, C. HAROLD. "Are Vocational Orientation Courses Worth Their Salt?" *Educational and Psychological Measurement* 8: 161-81; Summer 1948.
47. STROMSWOLD, STANLEY A., and WRENN, C. GILBERT. "Counseling Students Toward Scholastic Adjustment." *Educational and Psychological Measurement* 8: 51-63; Spring 1948.
48. THORNE, FREDERICK C. "Directive Psychotherapy: Suggestion, Persuasion, and Advice." *Journal of Clinical Psychology* 4: 70-82; January 1948.
49. THORNE, FREDERICK C. "Further Critique of Nondirective Methods of Psychotherapy." *Journal of Clinical Psychology* 4: 256-63; July 1948.
50. TRAVERS, ROBERT M. W. "A Critical Review of Technics for Evaluating Guidance." *Educational and Psychological Measurement* 9: 211-225; Summer 1949.
51. U. S. VETERANS ADMINISTRATION. *Review and Summary of a Study Evaluating the Veterans Administration Advisement and Guidance Program in New England.* Technical Bulletin, 1949, TB 7-10. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 19 p.
52. WEBB, WILSE B. "Occupational Indecision Among College Students." *Occupations* 27: 331-32; February 1949.
53. WILLIAMSON, EDMUND G. *Counseling Adolescents.* New York: McGraw-Hill Book Co., 1950. 548 p.
54. WILLIAMSON, EDMUND G. "Supervision of Counseling Services." *Educational and Psychological Measurement* 8: 297-311; Autumn 1948.
55. WRENN, C. GILBERT. "Trends and Predictions in Vocational Guidance." *Occupations* 25: 503-15; May 1947.
56. WRIGHT, H. WILKES, and DARLEY, JOHN G. "In Counseling and Guidance." *Journal of Educational Research* 41: 116-25; October 1947.
57. YOUNG, PAUL A. "Evaluating Vocational Guidance in the High School." *Improving Guidance and Personnel Services Through Research.* Evanston, Ill.: Northwestern University, 1946. 123 p. (Mimeo.)

CHAPTER VI

Guidance Thru Groups

JANE WARTERS

A RATHER large number of descriptive accounts of group-guidance practices were published during the past three-year period covered by this chapter. In addition, a limited number of reports on research and projects or experiments were subjected to some form of evaluation in this summary.

The focus in this chapter is upon reports on research and experimental projects. Studies of the nature of groups, of cultural relations, and of group therapy with the mentally or physically handicapped are not included.

Trends and General Developments

Provision for the Service. Surveys (12, 53, 55) showed that there was little change in the provision made for group guidance in the schools. Homerooms, student activities, special classes, conferences, and visits were the means most commonly provided. The homeroom was usually listed as a means for offering educational and vocational guidance, but analysis showed that it frequently served administrative rather than guidance purposes. The degree of participation in student activities was found to be generally low. Membership in a minority group or in a low socioeconomic group was shown to limit opportunities for participation (18, 37, 38). Thompson (48) found in a study of a residence-hall activity program that (a) effectiveness of an activity increased with increase in student responsibility; (b) much activity was developed and controlled by students which was not initiated by them; and (c) in general, the amount of responsibility shown was less than seemed consistent with educational objectives. Three factors seemed to make the activity program effective for social learning: (a) delegation of responsibility to students, (b) provision for each student to have as many varied social experiences as possible, and (c) a high degree of esprit de corps.

Problems of Students. Data from checklists, questionnaires, and interviews showed that the problems with which students wanted help were the same as in previous years: matters of vocation, adjustment to school or college, interpersonal relations, especially with regard to home-and-family relations and boy-and-girl relations; marriage; and recreation (9, 23, 28, 36, 51). The responses of some 1560 students summarized in one study revealed that these problems were not discussed in the schoolroom or were discussed only superficially (9).

The School Culture. The American Council on Education intergroup education project (37) revealed the confusion of values and standards present in most school societies and the results of the maze of divergent expectations in the way of selective and undesirable learning. Kelley (27) made a careful study of (a) the nature of the college society; (b) the influence upon it of the larger culture; (c) the interpersonal and intergroup relations on the college campus; (d) the parts played by different groups; and (e) in particular, the nature and function of the mores as social controls and the changing of college mores, especially as a result of veteran enrolment. The implications of campus mores for administrators and guidance workers were emphasized. Smucker (42) investigated the campus clique as an agency of socialization and found that the clique served a number of useful functions such as aiding adjustment to college life and being a means to secondary as well as primary contacts. Fults (16) and Skubic (39) showed how individual and group changes followed adoption of classroom technics that fostered good human relations and aided the development of improved social attitudes.

School Camps. Promising experiments were organized in Michigan and California to determine the value of school camps for pupil education and teacher training (41, 44). Things that could be taught naturally and effectively outdoors were the things emphasized. Some experimental camps were established as work-experience camps for senior high-school students but were similar to other school camps in objectives and basic patterns. The experimental use of one summer camp for delinquents and predelinquents showed that such camps had little value as isolated experiences but had considerable value as part of the year-round program when under the direction of professionally trained workers (47).

Training of Group Workers. Reports indicated an increased recognition of the need for group workers who not only qualify with regard to personal qualities but who also have the specialized knowledge and skills gained thru intensive training in group work and case work (11, 29). Certain recent textbooks for group workers brought out the importance of evaluation and included material, such as case studies of groups and transcriptions of group sessions, helpful in training workers in the analysis of the group process and in the evaluation of particular technics.

Group Technics

Basing his outline on a review of the literature, Super (45) offered a fourfold classification of group technics. He classified them according to purpose as orientation activities and therapeutic activities and according to methods as activity methods and discussion methods. He examined the value of these technics and the place of group guidance in the total program of personnel services.

Discussion. The technic most frequently reported was discussion. Schools participating in the Detroit Citizenship Education Study worked with small discussion groups in training pupils in problem-solving (10). Discussions both at home and at school were used to stimulate registering and voting (50). A number of progress reports were made on the experiments of the National Training Laboratory in Group Development, organized to study the dynamics of the adult-discussion group, the relationship of the individual to such a group, and the relationship of the group to the larger social environments of an organization and a community (6, 7, 14, 49). The reports presented findings regarding the roles of group members, leadership, and evaluation procedures. These reports have aroused some controversy and have caused some protests, especially against the terminology; but there is definite evidence that they have also stimulated efforts to improve conference and committee work with youth as well as adults (4). One report that grew out of the clinic work on leadership in large meetings is of significance to workers who use large meetings for group-guidance purposes. This report analyzed the basic weaknesses of large meetings as ordinarily conducted and described various technics found useful for increasing the effectiveness of large meetings (5).

Sociometric Technics. The use of sociometric technics in schools was stimulated by the American Council on Education project in intergroup education (26, 46) which helped to evaluate sociometry as a means to the over-all assessment of groups. Sociometric tests and sociograms, sociometric interviews, open questions, and open themes were used in diagnosing interpersonal relations and studying the association patterns in school groups. These technics proved effective in promoting emotional development and social adjustment on the part of pupils. Pepinsky (33) explored the meaning of "validity" and "reliability" as applied to sociometric tests and concluded that the traditional methods used in determining validity and reliability of such instruments as tests and rating scales could not be applied to sociometric tests and that there is need for systematic development of new concepts applicable to the field of sociometry.

Psychodrama, Sociodrama, Role-playing. The literature indicated extensive use of these technics in the classroom as well as in the special-group situation (17). Jennings (25) explained the principles of the sociodrama derived from Moreno's experimental work and outlined the method as used in the schoolroom. She stressed the importance of a graduated sequence of situations, of respect for the individual's areas of reticence, of the warming-up period, and of the use of the social-laboratory conditions potentially present in every classroom.

Leadership

Stodgill (43) surveyed studies undertaken to determine the personal traits of leaders. Zeleny (56) in his review of the research on leadership directed attention to a trend from study of the physical characteristics and personality traits of leaders to study of leaders in action. This trend is well illustrated in the revised and enlarged edition of Jennings' study of leadership (24). She found that leaders and isolates were alike in many ways with regard to physical appearance and personal qualities and that they differed mainly in their manner of interacting with others. The leaders were able to elicit positive reactions from others, whereas isolates showed a marked incapacity for establishing rapport with others. Both leadership and isolation were found indigenous to the specific social situation with the result that the leader in one community or situation might not become the leader in another.

Reports on the American Council on Education project in intergroup education (46) revealed the need for giving all pupils training in some aspect of leadership. The project staff found that some pupils lost all chance at such training because of their background and that most pupils did not understand leadership. The project staff found also that while pupils were permitted to choose leaders they were not assisted in analyzing the leaders' job and that they accordingly received little training in the other skills needed for group participation. Administrators and teachers usually held narrow concepts regarding the activities in which students could exercise authority. Suggestions offered for improving training of pupils in leadership included: (a) development of concepts of leadership which include concern for good human relations, (b) training of students in the analysis of offices and of group procedures, and (c) enlarging the range of leadership activities in which pupils have a chance to develop joint purposes with respect to what they want and consider important.

Deutsch (14) reported a study of the personalities and activities of discussion-group leaders. The personalities of the leaders were studied thru clinical technics. The leaders were observed as they functioned in group situations and were interviewed to determine the nature of their values and ideologies. Like Jennings, Deutsch found leadership to be the function of many interdependent variables, occurring in many situations and determined by both the personal characteristics of the leader and the nature of the particular environment in which he functioned.

As part of a study to determine the group origins of student leaders, Williamson (52) investigated the extent to which fraternity and sorority members dominated the most important campus positions during a three-year period at the University of Minnesota. The investigation showed a marked over-representation of fraternal groups in the offices studied.

Hostetter and McDaniel (22) drew a picture of the average junior high-school leader on the basis of data collected thru interviews and questionnaires. They, too, found student leaders not significantly different from their fellows with respect to intelligence and appearance.

Intergroup Work

Increased concern about prejudice, group conflicts, and juvenile delinquency was reflected in increased effort toward guidance in interpersonal and intergroup relations. Two projects reported are of considerable significance for group workers in education: (a) the Project of Intergroup Education in Cooperating Schools sponsored by the American Council on Education (26, 46) and (b) the Central Harlem Street Clubs Project of the Welfare Council of New York City (11). Both projects were experimental programs lasting almost three years, and both had research programs that ran concurrently with field operations. The ACE experiment in intergroup education was the joint undertaking of project staff and teachers in 18 cooperating schools. The general objective was to show the important part that school life plays in what young people learn about group living and to develop new materials, new technics, and new ways of mobilizing school-community resources for improving human relations and fostering intergroup understanding.

In the Central Harlem Street Clubs Project various agencies worked with the project staff in an experimental program with four teen-age gangs of boys and one group of girls. The workers found the members of the gangs hostile and aggressive but no different from members of other teen-age groups with regard to need for recognition, achievement, affection, and understanding. The gang was the most important influence in the lives of most members. Three stages were described in the development of the work with the gang members: (a) overcoming the members' distrust and gaining acceptance, (b) stimulating changes in attitudes and behavior, and (c) closing relationships. And, as in counseling, the stages overlapped and were interdependent. More success was had in influencing patterns of aggression than patterns of escape. With a few exceptions basic changes in the boys' ideology were not achieved.

Some projects for improving intergroup relations have been initiated by schools. Against a background of urban deterioration and social disorganization a California school set up a program to meet the needs of youth and adults in its service area who were not associated with any agency program (19). The project developed from a school canteen into a community cooperative recreation center with a 12-month program in which 15 community organizations participated. Success was attributed to such factors as democratic participation, easy membership requirements, adequate supervision, and sympathetic police protection.

Wittenberg (54) described a neighborhood organization which contributed to both individual and group growth. In an urban slum area four blocks were organized with two sides of the street being considered a block. The common interest differed from block to block but, in the main, was concerned with gang warfare, prostitution, child care, housing violations, and recreation. Directing efforts toward modification of the environment served to decrease hostilities and frustrations.

Group Therapy

Hobbs (20) stressed the need for greater use of group therapeutic methods because of the small number of trained workers available to aid the great number of persons needing their services. Super (45) pointed out that increased use of group therapeutic procedures has also been made necessary by the failure of group orientation methods and that the failure is due in part to the fact that group workers charged with orientation quite often are teachers converted into counselors who make group guidance synonymous with teaching. Other reports indicated that acceptance was being gained for Moreno's views that group therapeutic procedures should not be considered as expedients or substitutes for individual therapy but as treatments in their own rights yielding values not always obtainable thru individual therapy (40). Redl (35) stressed the point that use of the term "group therapy" requires recognition of a psychology of group life.

Methods and technics were described in a number of reports which indicated general recognition that positive results can be produced by different procedures and that the basic dynamics are similar in all forms of group therapy (13, 30, 31, 32, 34, 40). Common factors underlying success in the use of various technics were held to be: (a) the worker's acceptance of group members and confidence in their ability to draw on their own capacities for growth, (b) a permissive atmosphere, and (c) group support. The results of group therapy were described as supportive, cathartic, insightful, and socializing.

Peres (34) found that the benefited members of one group showed a therapeutic pattern similar to that in nondirective individual therapy. Using data from six recorded group sessions and the subjective evaluation of responses to a questionnaire study made three months after completion of therapy, he tried to determine the relation between verbal expression of members during the group sessions and the value received from such therapy. His study revealed decided differences in patterns of conversation for the benefited and the nonbenefited, and furthermore showed that the value of the group work increased for the benefited members after therapy ended. Malone (31) in an analysis of the dynamics of group psychotherapy based on observations in a 12-month experimental program showed that success varied with the degree of group solidarity and the rate of social interaction and that it was most likely to be attained when group sentiment, commonalty of interests and of objectives, intergroup mobility, and democratic organization were strong.

Luchins (30) brought out the need for controlled experimental methods in group therapy in order to gain clarification regarding actual outcomes, relative effectiveness of group therapy in comparison with individual therapy, and functions of the group. He described four methods used in two army hospitals for controlling the program while in progress. Pepinsky (32) stated that there is need for research in the study of outcomes rather than in the study of the process of therapy and described the experimental approach used in group counseling at a state college. The literature in general indicated that more research needs to be done with regard to all phases before final conclusions can be drawn about the nature of the therapeutic process or the efficacy of particular methods.

Bibliography

1. ALBRECHT, MILTON, and GROSS, LLEWELLYN. "Nondirective Teaching." *Sociology and Social Research* 32: 874-81; May-June 1948.
2. ARBUCKLE, DUGALD S. "A College Experiment in Orientation." *Occupations* 28: 112-17; November 1949.
3. ATKINSON, GRETCHEN. "The Sociogram as an Instrument in Social-Studies Teaching and Evaluation." *Elementary School Journal* 50: 74-85; October 1949.
4. BARNES, FRED P. "How Can Group Dynamics Be Applied to the School Staff?" *Bulletin of the National Association of Secondary-School Principals* 34: 40-45; April 1950.
5. BRADFORD, LELAND P. "Leading the Large Group Meeting." *Adult Education Bulletin* 14: 38-50; December 1949.
6. BRADFORD, LELAND P. "National Training Laboratory in Group Development: A Report to the Adult Education Profession." *Adult Education Bulletin* 14: 67-82; February 1950.
7. BRADFORD, LELAND P., and FRENCH, JOHN R. P., editors. "The Dynamics of the Discussion Group." *Journal of Social Issues* 4: 1-75; Spring 1948.
8. BRADY, ELIZABETH H. "Education for Leadership." *Journal of Educational Sociology* 21: 507-17; May 1948.
9. CHEYNEY, TRUMAN. "A Method of Identifying Problems of High School Students." *Occupations* 27: 387-90; March 1949.
10. CLEARY, FLORENCE; DAVIS, ALICE; and MEIER, ARNOLD. "Project in Problem-Solving." *Clearing House* 23: 67-70; October 1948.
11. CRAWFORD, PAUL L., MALMUD, DANIEL I.; and DUMPSON, JAMES R. *Working with Teen-Age Groups: A Report on the Central Harlem Street Club Project.* New York: Welfare Council of New York City, 1950. 162 p.
12. CUNLIFFE, REX. *The Guidance Program in the Secondary Schools of New Jersey.* New Brunswick, N. J.: Rutgers University Press, 1950. 57 p.
13. DAVIS, RUTH GREENLEE. "Group Therapy and Social Acceptances in a First-Second Grade." *Elementary School Journal* 49: 219-23; December 1948.
14. DEUTSCH, MORTON; PEPITONE, ALBERT; and ZANDER, ALVIN. "Leadership in the Small Group." *Journal of Social Issues* 4: 31-40; Spring 1948.
15. FEDDER, RUTH. *Guiding Homeroom and Club Activities.* New York: McGraw-Hill Book Co., 1949. 467 p.
16. FULTS, ANNE C. "An Experiment in Human Relations." *Journal of Home Economics* 40: 71-72; February 1948.
17. HAAS, ROBERT B., editor. *Psychodrama and Sociodrama in American Education.* New York: Beacon House, 1949. 319 p.
18. HAND, HAROLD. "Hidden Tuition Charges in Extra-Class Activities." *Educational Forum* 14: 95-103; November 1949.
19. HERRIOTT, MARION E., and KAPLAN, LEON L. "Recreation Co-op: 15 Groups Work Through School." *Clearing House* 23: 195-99; December 1948.
20. HOBBS, NICHOLAS. "Group Psychotherapy in Preventive Mental Hygiene." *Teachers College Record* 50: 170-78; December 1948.
21. HOPPOCK, ROBERT. *Group Guidance Principles, Techniques, and Evaluation.* New York: McGraw-Hill Book Co., 1949. 393 p.
22. HOSTETTER, HELEN M., and MCDANIEL, HENRY B. "Student Leadership in Junior High School." *California Journal of Secondary Education* 23: 57-59; January 1948.
23. HUNTER, RUTH, and MORGAN, DAVID H. "Problems of College Students." *Journal of Educational Psychology* 40: 79-92; February 1949.
24. JENNINGS, HELEN HALL. *Leadership and Isolation: A Study of Personality in Inter-Personal Relations.* Second edition. New York: Longmans, Green and Co., 1950. 349 p.
25. JENNINGS, HELEN HALL. "Sociodrama as Educative Process." *Fostering Mental Health in Our Schools.* 1950 Yearbook. Washington, D. C.: Association for

Supervision and Curriculum Development, a department of the National Education Association, 1950. p. 260-85.

26. Jennings, Helen Hall. *Sociometry in Group Relations.* Washington, D. C.: American Council on Education, 1949. 85 p.
27. Kelley, Janet Agnes. *College Life and the Mores.* New York: Columbia University, Teachers College, 1949. 308 p.
28. Klohr, Mildred C. "Personal Problems of College Students." *Journal of Home Economics* 40: 447-48; October 1948.
29. Limbert, Paul M., and others. "Major Trends and Developments in Professional Aspects of Group Work." *A Decade of Group Work.* New York: Association Press, 1948. p. 141-49.
30. Luchins, Abraham S. "Methods of Studying the Progress and Outcomes of a Group Psychotherapy Program." *Journal of Consulting Psychology* 11: 173-83; July 1947.
31. Malone, Thomas P. "Analysis of the Dynamics of Group Psychotherapy Based on Observations in a Twelve-Month Experimental Program." *Journal of Personality* 16: 245-77; March 1948.
32. Pepinsky, Harold B. "An Experimental Approach to Group Therapy in a Counseling Center." *Occupations* 28: 35-40; October 1949.
33. Pepinsky, Pauline Nichols. "The Meaning of 'Validity' and 'Reliability' as Applied to Sociometric Tests." *Educational and Psychological Measurement* 9: 39-49; Spring 1949.
34. Peres, Hadassah. "An Investigation of Nondirective Group Therapy." *Journal of Consulting Psychology* 11: 159-72; July-August 1947.
35. Redl, Fritz. "Resistance in Therapy Groups." *Human Relations* 1: 307-13; August 1948.
36. Remmers, Herman Henry, and Shimberg, Benjamin. *Problems of High School Youth.* Purdue Opinion Poll for Young People, Report No. 21. Lafayette, Ind.: Purdue University, Division of Educational Reference, 1949. 37 p. (Mimeo.)
37. Robinson, John T., and Brady, Elizabeth H. "The School Culture and Educational Planning." *Journal of Educational Sociology* 21: 499-507; May 1948.
38. Shannon, John R., and Kittle, Marion A. "Analysis of 21 Groups in One School: Economic Discrimination in School Activities." *Clearing House* 22: 71-72; October 1947.
39. Skubic, Elvera. "A Study in Acquaintanceship and Social Status in Physical Education Classes." *Research Quarterly of the American Association of Health, Physical Education, and Recreation* 20: 80-87; March 1949.
40. Slavson, Samuel R., editor. *The Practice of Group Therapy.* New York: International Universities Press, 1947. 271 p.
41. Smith, Julian W. "The Michigan Story of Camping and Outdoor Education." *Journal of Educational Sociology* 23: 508-15; May 1950.
42. Smucker, Orden. "The Campus Clique as an Agency of Socialization." *Journal of Educational Sociology* 21: 163-68; November 1947.
43. Stogdill, Ralph M. "Personal Factors Associated with Leadership." *Journal of Psychology* 25: 35-71; January 1948.
44. Studebaker, John W. "Why Not a Year-Round Educational Program?" *Journal of Educational Sociology* 21: 269-75; January 1948.
45. Super, Donald E. "Group Techniques in the Guidance Program." *Educational and Psychological Measurement* 9: 496-510; Autumn 1949.
46. Taba, Hilda, editor. "School Culture and Group Life." *Journal of Educational Sociology* 21: 497-556; May 1948.
47. Thomas, John W. "An Experimental Use of the Summer Camp as Part of a Remedial Program of Juvenile Delinquents." *Religious Education* 42: 211-16; July 1947.
48. Thompson, Florence M. "Residence Halls and the Educational Program." *Educational Record* 29: 64-71; January 1948.
49. Utterback, William E., editor. "Group Discussion." *Adult Education Bulletin* 13: 66-95; February 1949.
50. Van Hoesen, Ralph. "A Study of the Influence of Certain Specific School Activities on Adult Voting." *Journal of Educational Research* 42: 332-42; January 1949.

51. WILLIAMS, LUCILE H. "Problems of California High School Seniors." *California Journal of Secondary Education* 24: 73-78; February 1949.
52. WILLIAMSON, EDMUND G. "The Group Origins of Student Leaders." *Educational and Psychological Measurement* 8: 603-12; Winter 1948.
53. WIMMER, NANCY E. "Guidance in Secondary Schools." *School Review* 56: 343-49; June 1948.
54. WITTENBERG, RUDOLPH M. "Personality Adjustment Through Social Action." *American Journal of Orthopsychiatry* 18: 207-21; April 1948.
55. WRENN, C. GILBERT, and DUGAN, WILLIS E. *Guidance Procedures in High School.* Minneapolis: University of Minnesota Press, 1950. 71 p.
56. ZELENY, LESLIE DAY. "Leadership." *Encyclopedia of Educational Research.* (Edited by Walter S. Monroe.) New York: Macmillan Co., 1950. p. 662-67.

CHAPTER VII

Educational and Vocational Information

WALTER J. GREENLEAF

INVESTIGATIONS in the area of educational and vocational information originated in so many different sources that only a few could be included in this brief chapter. Therefore, those studies having national implications were selected. Most such studies were made in governmental agencies equipped with staffs and facilities to collect extensive data, make tabulations, and interpret the findings. A few other researches were included because they contributed specifically to certain topics.

Educational Information

Educational Patterns. The Bureau of the Census revealed (16) that the general educational pattern among adults proves the historical trend toward more and more schooling. Adults at successively younger ages have received a higher level of education. Persons 25 years of age or over were considered to have completed their formal schooling. With an increase of age the median number of years of school completed was progressively lower. For example, persons 25 to 29 years old attained 12.0 years of school. This was interpreted as four years of high school. Persons 65 years of age and over completed only 7.7 years of school, or somewhat less than eight years of elementary school. At each age level, females had a slightly higher median of attainment than males.

"Functional illiteracy" continued to decline as was evident from the decrease in the number who had completed less than five grades of school—from almost 1,500,000 in 1940 to less than a million in 1947. Most of the 1940 "illiterates" were not in school in 1947. These probably represented the noneducable segment of the population such as mental defectives.

In October 1949, according to the Bureau of the Census (13), a total of 28.7 million boys and girls five to 24 years old were enrolled in school:

	Age	*Number enrolled*	*Percent of each age group*
	5 years	618,000	22%
	6 years	2,869,000	95
	7-9 years	7,528,000	99
	10-13 years	8,846,000	99
	14 and 15 years	3,922,000	94
	16 and 17 years	2,856,000	70
	18 and 19 years	1,028,000	25
	20-24 years	1,041,000	9
Total	5-24 years	28,707,000	62

There were 700,000 more persons five to 24 years old enrolled in school than in October 1948. The highest enrolment was in the seven thru 13-year-old group with 99 percent enrolled in school. This was attributed largely to the fact that these ages are included under the compulsory school attendance laws in practically all states. The Navy (59) pointed out the advantages of young people's staying in high school, graduating and going on to college if they can, because experience has shown that young people will serve themselves and their country better by obtaining the maximum of educational background before launching upon their life work.

The Bureau of the Census also found (19) that in 1949 one in every six students of high-school age was working outside of school hours. At the beginning of the school year in October 1949, 1,200,000 boys and girls 14 thru 17 years old were both enrolled in school and employed mostly at part-time jobs, and another 100,000 were looking for work. In 1940, when employment opportunities for inexperienced minors were relatively scarce, only 300,000 such students were in the labor force. In interpreting the figures the Bureau of the Census pointed out that the rise over the past decade in the proportion of young students in the labor force was significant because it marked a sharp reversal in the historic downward trend in the labor-force participation of youth. Of the students of college age, about 29 percent of the 18- thru 24-year-olds were in the labor force in October 1949, an increase of 9 percent over 1940. About nine-tenths of the 14- thru 17-year-olds outside the labor force were attending school; only half of those in the labor force were also students.

Drop-outs. Gaumnitz and Thompkins (4) discovered that high schools fall far short of their announced goal of serving *all* youth. More than half of all youth either did not enter high school or dropped out before graduation. Two out of five dropped out *after* entering high school. The holding power of the larger schools was no greater than that of the smaller ones.

Dillon (2) studied 1171 school leavers and found that of the 16-year-olds 212 dropped out in the ninth grade and 227 in the tenth grade. He also checked the frequency of reasons given by 957 youths as of first importance in the decision to leave school: (a) preferred work to school—36 percent; (b) needed money to buy clothes and help at home—15 percent; (c) was not interested in schoolwork—11 percent; (d) could not learn and was discouraged—7 percent; (e) was failing and did not want to repeat grade—6 percent; (f) wanted spending money—6 percent; (g) disliked a certain teacher—5 percent; (h) ill health—5 percent; (i) disliked a certain subject—3 percent; (j) friends had left school—3 percent; (k) parents wanted youth to leave school—2 percent; (l) could learn more out of school than in school—1 percent. These students also made certain pertinent suggestions to school administrators to encourage potential drop-outs to remain in school: (a) provide work experience—23 percent; (b) provide vocational instruction—15 percent; (c) provide services of a guidance counselor—12 percent; (d) more personal contact with teachers—11 percent; (e) more participation in school activities—11 percent; (f) more opportunity to change courses—11 percent.

In studying 524 out-of-school youth in Louisville, Kentucky, Johnson and Legg (9) found that 440 had not completed high school because of: (a) dissatisfaction with school—48 percent; (b) economic need—19 percent; (c) lure of a job—12 percent; (d) marriage—7 percent; and (e) other causes—15 percent. Many complained of failing grades and not liking the courses or the teachers.

College Enrolments and Costs. In the fall of 1950, Story (11) found that 2,295,000 resident students were enrolled in 1888 colleges and universities. This figure represented a 9.3 percent loss of men students over the previous year, and a 0.2 percent loss of women students. With respect to veterans only, there were 575,000 veterans enrolled in the colleges in 1950-51 representing a loss of 32.9 percent over the previous year when 856,000 veterans were enrolled.

College costs have zoomed to new heights, but no over-all recent study has been made. An inspection of the Fiftieth Annual Report on Medical Education (1), however, revealed the resident tuition fees in the 72 medical schools and seven schools of the basic medical sciences in 1950-51. Seventy-six schools furnished data for the report and estimated the financial outlays experienced by their students during one academic year for tuition, fees, books, equipment, travel, and all essential costs. A student in medical school for a single year of nine months paid a median cost of $1473 with a range from $567 to $2252. Tuition fees alone ranged from $97 to $867 with a median of $600 compared with a $577 median for the previous year.

Vocational Information

Occupational Research. In the past three years occupational research provided a wealth of vocational information. The findings were especially useful at all educational levels for students who use such materials for guidance purposes, and particularly important for counselors in their work with high-school and college students. In the training of counselors in the colleges and universities it was unfortunate that the results of such extensive and expensive researches did not find wider use. According to Froehlich and Spivey (3) only 100 institutions out of 930 colleges and universities offering guidance courses provided occupations courses for school counselors. Obviously counselors trained in these institutions were left to their own devices when it came to untangling and organizing the occupational data that were available to them. One reason for omitting such courses may have been the lack of qualified individuals prepared to teach occupations courses. As an immediate aid in promoting occupations courses at the college level, a special committee prepared a report (60) on the goals of counselor preparation in the occupational area.

Occupational Census. In preparing to take the 1950 census, the Bureau of the Census classified occupations and issued a useful alphabetical index of occupations and industries (21). Early in 1950 the census enumerators questioned persons in the labor force about their occupations. Data were not available in 1950, but summary figures for 11 major occupational groups will be released in 1951 and detailed tabulations will probably be delayed until 1952. Meantime the Bureau of the Census released a number of sample studies and also a census of manufactures (22, 23).

Unemployment. In its annual report of the labor force for 1949, the Bureau of the Census pointed out (17) certain major developments. High levels of employment generally prevailed during 1949 with a total civilian employment average of 68,700,000 during the year. Unemployment was substantially above the 1947 and 1948 levels as job opportunities declined in 1949 while the labor force continued to expand. Curtailed job opportunities in nonagricultural industries accounted for practically all of the decline in employment from the 1948 level. Agricultural employment was at about the same level during 1949 as in 1948. Altho employment dropped by only 1 percent, man-hours worked by the labor force generally in 1949 were about 2.5 percent under the 1948 total.

Older Workers. In the total population (148,720,000) residing in the continental United States on July 1, 1949, the Bureau of the Census estimated (15) that a total of 11,270,000 persons were 65 years old and over. The rapid increase in the number of the aged in recent decades has resulted in widespread interest in the problems of that group. The trend toward a larger number of older persons was credited to increases in the number of births in the nineteenth century, to lowered mortality rates resulting from better medical care and a higher standard of living, and to a generally increasing volume of immigration up to World War I.

Internal Migration. For the year ended April 1949, the Bureau of the Census studied internal migration (12) in the United States. About one out of every five persons (28,000,000) was living in a different house from the one he had lived in a year earlier. Nineteen million had moved within a county. Four million had changed their county of residence within a state. Another 4,000,000 had moved from one state to another. Half a million had been living abroad a year earlier. Three-fourths of the population remained in their respective states and found employment there. Counselors used such findings to show that it is not invariably necessary for young people to go far away from home to make a living.

Incomes. Income studies about occupations in recent years have been most difficult to conduct because of such variables as inflation, general wage increases, and the fluctuation in real money value. In 1948 the Bureau of the Census studied and summarized the incomes of families and persons in the United States (20). The study was especially welcome to those who needed significant figures as a basis for reckoning present and future needs. An estimated distribution of persons 14 years of age and over by annual wage or salary income, by sex, for the United States, urban and rural, in 1948 was presented.

For those with incomes of $5000 and over in 1948, the same study showed that the following five groups accounted for 86 percent of the heads of families: (a) proprietors, managers, and officials (25 percent); (b) craftsmen, foremen (20 percent); (c) operatives (15 percent); (d) clerical, sales, and kindred workers (14 percent); and (e) professional and semiprofessional workers (12 percent).

Manufacturing. The *Census of Manufactures, 1947* (22, 23) was the first to appear since 1939. It was customary until 1939 to take this census every year, but World War II interrupted the sequence. In the future the Bureau of the Census plans to take this census every fifth year. The 1947 report contained a description of each of the 453 industries into which manufacturing establishments were classified. One out of six manufacturing establishments in the United States was concerned with food and kindred products. One in eight produced apparel and related products. One in eight was a printing and publishing establishment. One in ten manufactured lumber and products, except furniture. The number of establishments in these four industry groups accounted for half of all in the manufacturing industry. The manufacture of machinery required the greatest number of employees (1,545,000 in 1947) closely followed by the food and kindred products industry with 1,442,000 employees.

Dictionary of Occupational Titles (DOT). In March 1949 the U. S. Employment Service made the first revision of the *Dictionary of Occupational Titles* (36). Originally published in 1939, the Dictionary for the first time made available descriptive information about most American occupations. Altho prepared primarily for the use of public employment offices and related vocational and personnel services, school counselors and teachers used it widely in advising students about their future occupations. It has proved to be one of the best single sources of job descriptions in the United States.

The collaborators of the *Dictionary of Occupational Titles* aimed to define jobs in broad, all-inclusive terms that could be applied generally to opportunities in all localities, but did not attempt to cover such variables as hours, wages, or jurisdictional matters. Trained job analysts went into hundreds of industrial plants and business establishments to observe thousands of occupations and record the information on job analysis schedules. Schedules on the same type of job were prepared by analysts in widely scattered offices in order that the composite national descriptions could incorporate all of the variations in a job. Completed schedules, varying from two to 30 pages, were sent to Washington where technical writers prepared the composite descriptions. The number of job analysis schedules in 1939 totaled 44,000 and subsequently reached well over 100,000.

The 1949 revision was divided into two volumes: Volume I, *Definitions of Occupational Titles;* and Volume II, *Occupational Classification* with code numbers and definitions of industrial designations. In Volume I the collaborators defined 22,028 different jobs which were also known by 17,995 additional titles, making a total of 40,023 defined titles. They kept in mind the fact that new jobs constantly appear and old ones change or become obsolete. The continuing nature of such research as a part of normal office operations materially aided the revisers of the compilation in 1949. In Volume II the collaborators featured a classification structure based on code numbers that automatically arranged occupations according to job factors, and added an industry index with definitions of industries and job titles arranged by industry.

The *Dictionary of Occupational Titles* has facilitated labor recruitment for war industries and has been particularly useful to Selective Service Boards. In addition it has furnished a means of classifying civilian skills of persons entering and leaving the armed forces. In guidance programs it has often been the only source in which counselors and students could secure accurate information about obscure occupations.

Government Monographs on Occupations. Various Federal agencies have issued bulletins, leaflets and pamphlets that describe single occupations, or single groups of occupations. Greenleaf (5) summarized 285 of these publications. Those released since 1947 are briefly mentioned below.

Based on a large amount of research, the Women's Bureau published a number of bulletins directed to the guidance of girls and women in certain occupational fields at both high-school and college level. These monographs include: architecture and engineering (47), biological sciences (45), chemistry (44), dietetics (55), federal service (52, 53); geology, geography and meteorology (49); handbook of facts on women workers (51); higher-level positions (57), mathematics and statistics (46), occupations related to science (50), power laundries (40), physics and astronomy (48), police work (54), radio (42), science (43), social case work (56), telephone industry (39), and women's occupations thru seven decades (41).

In June 1947 the U. S. Employment Service issued their *Occupational Guide Series* (37, 38). Each guide was printed separately on heavy paper, 5 x 8 inches, ready for filing. Two types of guide were made: one on white paper stock *Job Description for (69 Jobs)* (37); and one on yellow paper stock *Labor Market Information for (21 Jobs)* (38). The outline for the former (37) included such topics as: (a) job summary, (b) work performed, (c) training, (d) occupational tests, (e) related occupations, (f) physical activities, (g) working conditions, (h) hazards, and (i) employment variables. The outline for the latter (38) included: (a) economic characteristics, (b) job prospects, (c) wages, (d) hours, (e) hiring practices, (f) provision for tools and equipment, (g) entrance and advancement on the job, and (h) unions. Each guide was planned as a separate unit and material was collected as a result of nationwide studies. These brief, authentic, and pertinent guides about certain occupations were useful in helping young people to solve their occupational problems.

Occupational Outlook and Trends. Since 1947, the Bureau of Labor Statistics (BLS), thru its outlook research program, has developed a number of studies of special interest to counselors and guidance officers. From many sources both in and out of the government, the BLS obtained extensive information on employment, hours and earnings in industries, trends, and technological developments. The BLS staff then analyzed the information with the assistance of industrial leaders, trade unions, and professional societies. BLS researches on the status and outlook in different occupations and industries followed a general pattern to show what was done, demand and supply of products, job prospects in different areas, duties, training, qualifications, working conditions, earnings, and often prospects in different geographical parts of the United States. Descriptive vocational monographs were released on: building trades (24), ceramic engineers (25), electric light and power occupations (26), elementary- and secondary-school teachers (27), engineers (28), nurses (29), petroleum production and refining (32), plastics products industry (33), radio and television broadcasting occupations (34), and railroad occupations (35).

In 1949 the BLS also issued the *Occupational Outlook Handbook* (30) including vocational information on 288 occupations. This descriptive study based on BLS research findings was prepared at the request and with the financial support of the Veterans Administration. The occupations selected were those found by the Veterans Administration to be of major interest to veterans requesting guidance. Some of the smaller fields were also included. The opportunities described represented about four out of five of the professional occupations, three out of four of the skilled occupations, two out of five of the clerical occupations, and one out of three of the service occupations. Certain types of information readily available from other sources were not included. This handbook was designed to reach some of the 1.5 million young people who enter the labor force each year, many of whom lack adequate job information.

The *Occupational Outlook Handbook* also included certain predictions concerning a number of jobs. Researchers have long known that it would be extremely useful in the occupational world if they could predict with certainty changes in the level of employment in various fields of work. Such predictions, however, have always been fraught by unforeseen conditions that completely change any predictions that might be made. Even short-time predictions have been upset because of wars, rumors of wars, inflation, depression, shortages of materials and supplies, weather, and innumerable other causes.

Bibliography

1. Anderson, Donald G., and Tipner, Anne. "Fiftieth Annual Report on Medical Education in the United States and Canada." *American Medical Association Journal* 114, 109-84; September 9, 1950.
2. Dillon, Harold J. *Early School Leavers—A Major Educational Problem.* Publication 401. New York: National Child Labor Committee, 1949. 94 p.
3. Froehlich, Clifford P., and Spivey, Helen E. *Guidance Workers' Preparation.* Misc. 3333. Washington, D. C.: U. S. Office of Education, Federal Security Agency, July 1949. 45 p.
4. Gaumnitz, Walter H., and Thompkins, Ellsworth. *Holding Power and Size of High Schools.* U. S. Office of Education, Federal Security Agency, Circular No. 322. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 25 p.
5. Greenleaf, Walter J. *Government Monographs on Occupations.* Misc. 3296. Washington, D. C.: U. S. Office of Education, Federal Security Agency, July 1948. 8 p.
6. Greenleaf, Walter J. *Sociodrama as a Guidance Technique.* Washington, D. C.: U. S. Office of Education, Federal Security Agency, December 1950. 6 p. (Mimeo.)
7. Greenleaf, Walter J. *Visual Aids for Guidance Programs.* Misc. 3323. Washington, D. C.: U. S. Office of Education, Federal Security Agency, May 1950. 10 p.
8. Greenleaf, Walter J. *What School or College?* Misc. 3276. Washington, D. C.: U. S. Office of Education, Federal Security Agency, July 1950. 6 p.
9. Johnson, Elizabeth S., and Legg, Caroline E. "Why Young People Leave School." *Bulletin of the National Association of Secondary-School Principals* 32: 14-24; November 1948.
10. New York State Department of Education. *Vocational Training Opportunities in New York State.* Sixth edition. Albany: the Department, 1950. 143 p.
11. Story, Robert C. "1950 Fall College Enrollment." *Higher Education* 7: 1-3; December 15, 1950.
12. U. S. Department of Commerce, Bureau of the Census. *Internal Migration in the United States: April 1948-April 1949.* Current Population Reports, Series P-20, No. 28. Washington, D. C.: the Bureau, 1950. 11 p.
13. U. S. Department of Commerce, Bureau of the Census. *School Enrollment of the Civilian Population: October 1949.* Current Population Reports, Series P-20, No. 30. Washington, D. C.: the Bureau, 1950. 10 p.
14. U. S. Department of Commerce, Bureau of the Census. *Children and Youth: 1950.* Current Population Reports, Series P-20, No. 32. Washington, D. C.: the Bureau, 1950. 17 p.
15. U. S. Department of Commerce, Bureau of the Census. *Estimates of the Population 65 Years Old and Over, for Continental United States July 1, 1940 to 1949, and for States, July 1, 1948.* Current Population Reports, Series P-25, No. 37. Washington, D. C.: the Bureau, 1950. 3 p.
16. U. S. Department of Commerce, Bureau of the Census. *Educational Attainment of the Civilian Population: April 1947.* Current Population Reports, Series P-50, No. 15. Washington, D. C.: the Bureau, May 4, 1948. 15 p.
17. U. S. Department of Commerce, Bureau of the Census. *Annual Report of the Labor Force: 1949.* Current Population Reports, Series P-50, No. 19. Washington, D. C.: the Bureau, March 2, 1950. 29 p.
18. U. S. Department of Commerce, Bureau of the Census. *Fulltime and Parttime Workers: November, 1949.* Current Population Reports, Series P-50, No. 21. Washington, D. C.: the Bureau, March 31, 1950. 8 p.
19. U. S. Department of Commerce, Bureau of the Census. *School Enrollment of Workers in the United States, October, 1949.* Current Population Reports, Series P-50, No. 23. Washington, D. C.: the Bureau, May 3, 1950. 8 p.
20. U. S. Department of Commerce, Bureau of the Census. *Income of Families and Persons in the United States: 1948.* Current Population Reports, Series P-60, No. 6. Washington, D. C.: the Bureau, February 14, 1950. 29 p.
21. U. S. Department of Commerce, Bureau of the Census. *Alphabetical Index*

of Occupations and Industries: 1950. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 374 p.

22. U. S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS. *Census of Manufactures, 1947: Summary Statistics.* MC201. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 65 p.
23. U. S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS. *Census of Manufactures, 1947: Industry Descriptions.* MC202. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 57 p.
24. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Employment Outlook in the Building Trades.* Bulletin No. 967. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 121 p.
25. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Economic Status of Ceramic Engineers: 1939-47.* Washington, D. C.: the Bureau. (Mimeo.)
26. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Employment Outlook in Electric Light and Power Occupations.* Bulletin No. 944. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 49 p.
27. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Employment Outlook for Elementary and Secondary School Teachers.* Bulletin No. 972. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 89 p.
28. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Employment Outlook for Engineers.* Bulletin No. 968. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 119 p.
29. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *The Economic Status of Registered Professional Nurses.* Bulletin No. 931. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 69 p.
30. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Occupational Outlook Handbook.* Bulletin No. 940. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 453 p.
31. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Occupational Outlook Summary: Defense Program Boosts Demand for Engineers.* Washington, D. C.: the Bureau, November 27, 1950. 1 p.
32. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Employment Outlook in Petroleum Production and Refining.* Bulletin No. 994. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 52 p.
33. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Employment Outlook in the Plastics Products Industry.* Bulletin No. 929. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 20 p.
34. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Employment Outlook in Radio and Television Broadcasting Occupations.* Bulletin No. 958. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 69 p.
35. U. S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS. *Employment Outlook in Railroad Occupations.* Bulletin No. 961. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 52 p.
36. U. S. DEPARTMENT OF LABOR, U. S. EMPLOYMENT SERVICE. *Dictionary of Occupational Titles.* Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. Vol. I, "Definition of Titles," 1581 p. Vol. II, "Occupational Classification and Industry Index," 750 p.
37. U. S. DEPARTMENT OF LABOR, U. S. EMPLOYMENT SERVICE. *Occupational Guide Series—Job Descriptions for 69 Different Jobs.* Washington, D. C.: Superintendent of Documents, Government Printing Office, 1947. 4-6 p.
38. U. S. DEPARTMENT OF LABOR, U. S. EMPLOYMENT SERVICE. *Occupational Guide Series—Labor Market Information for 21 Different Jobs.* Washington, D. C.: Superintendent of Documents, Government Printing Office, 1947. 4 p.
39. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Typical Women's Jobs in the Telephone Industry.* Bulletin No. 207-A. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1947. 52 p.
40. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Women Workers in Power Foundries.* Bulletin No. 215. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1947. 71 p.
41. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Women's Occupations Through*

Seven Decades. Bulletin No. 218. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1947. 260 p.

42. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Women in Radio.* Bulletin No. 222. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1947. 30 p.
43. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Science Series: Science.* Bulletin No. 223-1. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 81 p.
44. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Science Series: Chemistry.* Bulletin No. 223-2. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 65 p.
45. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Science Series: Biological Sciences.* Bulletin No. 223-3. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 87 p.
46. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Science Series: Mathematics and Statistics.* Bulletin No. 223-4. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 21 p.
47. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Science Series: Architecture and Engineering.* Bulletin No. 223-5. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 88 p.
48. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Science Series: Physics and Astronomy.* Bulletin No. 223-6. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 32 p.
49. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Science Series: Geology, Geography, and Meteorology.* Bulletin No. 223-7. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 52 p.
50. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Science Series: Occupations Related to Science.* Bulletin No. 223-8. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 33 p.
51. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Handbook of Facts on Women Workers.* Bulletin No. 225. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 79 p.
52. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Women in the Federal Service, 1923-47: Part I. Trends in Employment.* Bulletin No. 230-1. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 82 p.
53. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Women in the Federal Service, 1923-47: Part II. Occupational Information.* Bulletin No. 230-2. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 87 p.
54. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Police Work.* Bulletin No. 231. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 31 p.
55. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Dietetics.* Bulletin No. 234-1. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 80 p.
56. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Outlook for Women in Social Case Work in a Medical Setting.* Bulletin No. 235-1. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 59 p.
57. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Women in Higher Level Positions.* Bulletin No. 236. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 86 p.
58. U. S. DEPARTMENT OF LABOR, WOMEN'S BUREAU. *Women's Jobs; Advance and Growth.* Bulletin No. 232. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1949. 88 p.
59. U. S. NAVY DEPARTMENT, BUREAU OF NAVAL PERSONNEL. *U. S. Navy Occupational Handbook—A Manual for Civilian Guidance Counselors and Navy Classification Officers.* Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. Unpaged.
60. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *Counselor Competencies in Occupational Information.* Misc. 3314-3. Washington, D. C.: the Agency, March 1949. 28 p.

CHAPTER VIII

Preparation of Teachers and Specialists for Guidance Service

CLIFFORD P. FROEHLICH

THIS chapter is organized around nine topics, chosen because each designates an area in which significant contributions have been made during the last three years. The topics, broadly interpreted, may be thought of as research trends. Characteristically, however, the literature of the period was a restatement of opinions of individuals and groups, the essence of which was identified in previous reviews in this series. Most are investigations of the *status quo*. Only a few of the studies reviewed here may properly be called basic research.

Surveys of Employed Guidance Workers

A wide variety of qualifications was revealed in studies of persons employed in guidance positions. Goheen and Ohlsen (20) concluded that the "typical guidance worker" employed in Washington (state) schools had the following pattern of training courses: (a) general psychology, (b) educational psychology, (c) general sociology, (d) educational guidance, and (e) either educational measurements or mental measurements. Houston (25) reported a study of college personnel workers in 52 institutions by members of the committee of the American College Personnel Association, which made the unpublished study. Deficiencies in training and qualifications were mentioned most frequently by those personnel workers interviewed. Atkins (3) in a summary of a more comprehensive, but unidentified, study concluded that the desirable qualifications for personnel workers were personality, professional competence, intelligence, social consciousness, and character. Simmers and Davis (40) studied high-school guidance workers. The following specific guidance courses in order of frequency of mention were included in the training of 50 percent of the counselors: educational guidance, testing, adolescent psychology, vocational guidance, technics of counseling, child psychology, and sociology. All of the 406 counselors had teaching experience. Three hundred forty-four regarded such experience as valuable, but only 127 recommended a specific number of years. Simmers and Davis concluded that "basic training for all counselors must include general emphasis on attitude, personality, social skill, philosophy of life, plus special emphasis in the fields for which the student is trained."

Analyses of Guidance Positions

Logical analyses of counselors' functions and duties have been used as suggested by Jager (26) who proposed the job-analysis approach as a means of determining curriculum for training counselors. Fletcher (17) published a set of job descriptions based upon information gathered by means of questionnaire and personal contact. He described five counseling positions in noneducational agencies and seven counseling occupations in educational institutions. Each job description included alternate titles and discussed duties, qualifications, and prospects. Arnold (2) analyzed the replies to a questionnaire by 126 counselors and deans who devoted one-third or more time to counseling. Neither of these studies presented true "job analyses" in the sense that the term is used by the U. S. Employment Service. This Service, in cooperation with the Study Commission of the Council of Guidance and Personnel Associations and several State employment services, completed a job analysis of educational personnel work positions which now awaits publication.

Training Standards Recommended by Professional Associations

A committee of the American College Personnel Association proposed that the basic core of training for all personnel workers in colleges and universities include psychology of personality, social psychology, principles of learning, mental tests and their interpretations, interviewing and counseling procedures, and higher education. Representatives of eight professional associations and governmental agencies (1) recommended a common core of preparation for all counselors regardless of their place of employment or area of specialization. The recommended areas, each of which is described briefly in the committee report are: (a) philosophy and principles; (b) the study of the individual; (c) collecting, evaluating, and using occupational, educational, and related information; (d) administrative and community relationships; (e) technics used in counseling; and (f) supervised experience in counseling (35). In addition to work in these areas, a committee of the National Vocational Guidance Association proposed that counselors preparing to help persons with their educational and vocational problems receive training in: group methods in guidance, placement and follow-up technics, and methods of research and evaluation. The National Conference of State Supervisors of Guidance Services and Counselor Trainers in a series of reports published by the Office of Education of the Federal Security Agency (44, 45, 46, 47, 48, 49, 50) recommended that a counselor possess a master's degree with training in each of the following areas in addition to the basic guidance course: (a) the counseling process; (b) understanding the individual; (c) educational and occupational information; (d) administrative relationships of the guidance program; and (e) research and evaluation procedures for counselors. The specific competencies which a counselor should have in each of these areas were indicated.

The Guidance Role of Staff Members

The guidance functions associated with educational positions have received a great deal of attention (10, 11, 13, 14, 16, 19, 29, 30, 56). After surveying the guidance duties of 68 high-school principals in Kansas, Wilcox (52) concluded that many functions of an adequate guidance program were not provided in schools where the principal is the major guidance officer. Mathews (33) reported that 16 of 25 state superintendents believed that inservice guidance training should be provided for teachers, and that 11 believed that teacher-training programs should place more emphasis on the use of guidance technics. It appears that increasing attention is being given to the guidance role of persons other than counselors in order that appropriate guidance training may be planned for them.

Training Programs in College

Froehlich and Spivey (18) studied guidance offerings in colleges and universities by reading the course descriptions given in 1010 college catalogs. The authors classified the guidance offerings in 12 broad areas. Eighty percent of the institutions offered training in four or fewer of the areas. Seven hundred ninety-two institutions offered courses in the area of tests and measurements; 548, understanding the individual; 513, basic guidance courses; 453, mental hygiene; 169, counseling. Fewer than 100 institutions offered courses in the following areas: (a) occupational information; (b) supervised practice; (c) organization and administration; and (d) group methods. Of the 271 colleges and universities replying to a questionnaire prepared by LaBarre (31), 110 indicated that they had an organized program of graduate training for educational personnel work. Variations in the institution's interpretation of the questionnaire appear when the data reported in this study are compared with those obtained by independent evaluation of the guidance offerings in the same institutions reported in the Froehlich-Spivey study. The U. S. Office of Education continued its series of directories listing the summer offerings of guidance and personnel work in colleges and universities; the most recent one was the 1950 edition. In analyzing the contents of the 1948 listing, Bell (5) found that only one-third of the summer guidance instructors belonged to one of the major professional guidance organizations. Myers (34) analyzed the 1949 edition and noted an increase in the numbers of colleges and universities offering guidance courses.

Teaching Methods for Practical Application of Principles

During the period covered by this REVIEW, many recommendations for guidance training have emphasized laboratory experience and supervised practice (35, 48), but few studies of the effectiveness of these procedures have been published (4, 36). Berg and Van Dusen (8) described a training program for counselors of normal adults, which combined supervised practice in counseling with individual study and seminars. Ninety percent of the persons counseled by the trainees indicated satisfaction with their counselor. All trainees reported "a personal feeling of professional growth and competence." Hoppock (24) taught some classes in group guidance procedures by a "question-and-answer" method and with others used a "demonstration method." Differences between methods were evaluated by four criteria. Hoppock concluded that for these students working in these courses with this instructor in this institution, the demonstration method was clearly superior to the question-and-answer method. The data presented also suggest that Hoppock's conclusion should be generalized to indicate that students prefer the demonstration method.

Certification of Counselors

The certification of counselors by state departments of education was studied by Benson and Froehlich (6) and Woellner and Wood (54). The data reported by Woellner and Wood do not appear to be complete, since casual inspection by this reviewer revealed that the certification requirements for counselors in at least two states are not accurate. Woellner (53) in another article summarized his findings that 15 states issued certificates to public school counselors. Two additional states grant teaching certificates which recognize majors or minors in guidance work. All state certification plans follow the traditional pattern of prescribing a certain number of credit hours in specific courses, the median number of semester hours required being 16. Woellner, however, believes that it is unfortunate that the requirements are not being stated in terms of competencies which are expected of the applicant for a counselor's certificate. According to Woellner, courses required most frequently are the basic course, occupational information, counseling, tests and measurements, and analysis of the individual. However, even tho these are the courses most frequently required, their listing does not mean that the states have adequate certification requirements. Benson and Froehlich (6) found, for example, that half of the states having certification programs will issue counselor's certificates, even tho the applicant presents no evidence of training in the principles of counseling. Stone (42), in a survey of 498 school superintendents in California, found that 275 were in favor of a special certificate for guidance duties, 186 were opposed to it, and 37 were undecided. The Utah State Department of Public Instruction (51) in a questionnaire study of various groups of educators found practically unanimous attitude favoring the certification of counselors.

Personal Qualifications of Counselors

A priori standards for the selection of counselors emphasize the personal qualities of counselors (37, 38). Graver (21) asked 91 counselors to designate personality traits which they felt were necessary in their work. Hardy (22) concluded from a study of counselor responses to statements of counselees that the hypothesis that "dominance is negatively correlated with non-directiveness has not been sustained." Kaback (27), studying the characteristics of 34 nurse counselors, found that they had: (a) average or above mental ability; and (b) high social service, artistic, and literary scores, and low clerical, mechanical, and persuasive scores on the *Kuder Preference Record*. *Bernreuter Personality Inventory* and group Rorschach scores reflected well-adjusted personalities.

Tests of Counselor Competency

Schuyler (39) described a test of professional knowledge for secondary-school counselors. Counselors, she concluded, need more training in principles of psychology, mental hygiene, technics of counseling, and statistics. Drucker and Remmers (12) compared counselors' ratings with their scores on a test, *How I Counsel*. Self-ratings on quality of counseling done with students having vocational and personal problems correlated approximately .50 with test scores. Using the test, *How I Counsel*, McClelland and Sinaiko (32) developed an empirical scoring key for 40 of the 74 times. The American Board of Examiners in Professional Psychology have described the general contents of an examination given to applicants for its diploma in counseling and guidance (23). No studies of its validity have been published. Kelly and Fiske (28) reported preliminary validation data on various assessment procedures used for selection of clinical psychology trainees in the Veterans Administration. Interviews, projective tests, and other subjective evaluation procedures did not prove to be as valid as objective tests. An especially prepared key for the *Strong Vocational Interest Blank* yielded a single score which "predicted each of several criteria as well as any of the clinical judgments made in the entire assessment program." These findings, altho based on clinical psychology trainees, appear to have important implications for testing of potential guidance workers.

Summary

Despite individual variations, most recommendations for the training of guidance specialists agree that specialized training is necessary in addition to that required of teachers. These recommendations are supported in part by job analyses, but there is little other evidence of their validity. Surveys of employed guidance workers have thrown little light on the training needed, but have revealed the great disparity between recommended training and that actually possessed by on-the-job counselors.

There is bewildering variation in guidance courses offered by colleges and universities. Many instructors in these courses are not associated with professional guidance organizations. Few studies of teaching methods for guidance courses have been reported.

The desirability of counselor qualifications, as demanded by state certification plans, remains unconfirmed because no adequate research to support them has been reported. A promising beginning has been made in the study of personal qualifications and in developing tests of competence.

To this reviewer, the research most needed in this area should be designed to ascertain the validity of guidance training programs and methods. Such research should be directed toward determining what training is essential for success as a guidance worker and which teaching methods are most effective.

Bibliography

1. ANDERSON, GORDON V. "Professional Standards and Training for College Personnel Workers." *Educational and Psychological Measurement* 8: 451-59; Autumn 1948.
2. ARNOLD, DWIGHT L. "Time Spent by Counselors and Deans on Various Activities." *Occupations* 27: 391-93; March 1949.
3. ATKINS, WILLIAM H. "Training for Personnel Workers." *American Vocational Journal* 24: 4, 27; October 1949.
4. BEAR, ROBERT M., and ODBERT, HENRY S. "A Note on Appraising Counselors-in-Training." *Journal of Clinical Psychology* 4: 308-10; July 1948.
5. BELL, HUGH M. "Analysis of Summer Courses for Counselors." *Occupations* 26: 240-44; January 1948.
6. BENSON, ARTHUR L., and FROEHLICH, CLIFFORD P. "Certification of Counselors; Present Status in the States." *School Life* 30:19-22; July 1948.
7. BERDIE, RALPH F. "Counseling—An Educational Technique." *Educational and Psychological Measurement* 9: 89-94; Spring 1949.
8. BERG, IRWIN A., and VAN DUSEN, ALBERT C. "Training Program for Counselors of 'Normal' Adults." *American Psychologist* 4: 297-98; July 1949. (Abstract)
9. BRAYFIELD, ARTHUR H. "Functions of the Counselor in Secondary Schools." *California Journal of Secondary Education* 23: 468-71; December 1948.
10. CASON, ELOISE B. "The Emerging Role of the Teacher." *Educational Leadership* 5: 493-99; May 1948.
11. CHRISTENSEN, THOMAS E. "Responsibilities of the High-School Principal in the Guidance Program." *School Review* 57: 149-54; March 1949.
12. DRUCKER, ARTHUR J., and REMMERS, HERMANN H. "The Validity of University Counselor Self-Ratings." *Journal of Educational Psychology* 40: 168-73; March 1949.
13. DUDYCHA, GEORGE J. "Recent Literature on Careers in Psychology." *Occupations* 28: 455-61; April 1950.
14. ERICKSON, CLIFFORD E. "School Administrators Want Help." *Occupations* 27: 234-36; January 1949.

15. Feder, Daniel D. "Selection and Training of Faculty Counselors." *Trends in Student Personnel Work.* Minneapolis: University of Minnesota Press, 1949. p. 288-300.
16. Fitzgerald, William A. "Counseling Responsibilities of the School Librarian." *Wilson Library Bulletin* 24: 357-59; January 1950.
17. Fletcher, Frank M. "Occupations in Counseling." *Educational Research Bulletin* 28: 93-98, April; 127-37, May 1949.
18. Froehlich, Clifford P., and Spivey, Helen E. *Guidance Workers' Preparation.* Washington, D. C.: U. S. Office of Education, Federal Security Agency, 1950. 45 p.
19. Gashorn, Wenonah. "Teacher's Role in the Guidance Program." *Teachers College Journal* 20: 76-77; March 1949.
20. Goheen, Philip, and Ohlsen, Merle. "Guidance Worker's Job and His Preparation." *Bulletin of the National Association of Secondary-School Principals* 24: 242-47; January 1950.
21. Graver, Palmer. *A Study of Counselors in Selected Industrial, Educational, and Social Service Organizations.* Doctor's thesis. Evanston, Illinois: Northwestern University, 1948. p. 157-58.
22. Hardy, Virginia T. "Relation of Dominance to Non-Directiveness in Counseling." *Journal of Clinical Psychology* 4: 300-303; July 1948.
23. Hilgard, Ernest R. "Annual Report of the Policy and Planning Board of the American Psychological Association: 1947." *American Psychologist* 2: 191-98; June 1947.
24. Hoppock, Robert. "Two Methods of Training Counselors for Group Guidance; Experimental Evaluation." *Occupations* 27: 523-26; May 1949.
25. Houston, Clifford G. "Limited Survey of Professional Standards and Training of College Personnel Workers." *Educational and Psychological Measurement* 9: 445-46; Autumn 1949.
26. Jager, Harry A. "Trends in Counselor Training." *Occupations* 26: 477-82; May 1948.
27. Kaback, Goldie R. "Some Characteristics of Nurse Counselors." *Occupations* 26: 299-301; February 1948.
28. Kelly, E. Lowell, and Fiske, Donald W. "The Prediction of Success in the VA Training Program in Clinical Psychology." *American Psychologist* 5: 395-406; August 1950.
29. Knysh, Walter J. "Role of the Trade and Industrial Co-ordinator." *Industrial Arts and Vocational Education* 39: 304-306; October 1950.
30. Korniszewski, F., and Mallet, R. A. *School Psychologists.* Publication No. 105. Geneva: International Bureau of Education, 1948. 105 p.
31. LaBarre, Corrine. *Graduate Training for Educational Personnel Work.* American Council on Education Studies, Series 6, Student Personnel Work, No. 11. Washington D. C.: American Council on Education, 1948. 54 p.
32. McClelland, William A., and Sinaiko, H. Wallace. "An Investigation of a Counselor Attitude Questionnaire." *Educational and Psychological Measurement* 10: 128-33; Spring 1950.
33. Mathews, Blanche. "Classroom Teacher and Guidance." *Bulletin of the National Association of Secondary-School Principals* 34: 124-34; May 1950.
34. Myers, George E. "What Isn't Guidance?" *Occupations* 28: 162-63; December 1949.
35. National Vocational Guidance Association, Joint Committee To Consider the Common Elements in Counselor Training. *Counselor Preparation.* New York: the Association, 1949. 37 p.
36. Nelson, A. Gordon. "An Extension Project in Counseling." *School and Society* 66: 284-87; October 11, 1947.
37. Ohlsen, Merle M. "Guides for Selecting School Counselors." *School Executive* 69: 50-52; September 1949.
38. Polmantier, Paul C. "Don't Compromise on a Counselor." *School Executive* 67: 33-34; October 1947.
39. Schuyler, Helen K. "The Professional Knowledge of Secondary School Counselors: Its Measurement and Significance." *Transactions of the Kansas Academy of Science* 51: 340-43; September 1948.
40. Simmers, Lylah M., and Davis, Robert A. "Training and Experience of Counselors in North Central Schools." *School Review* 57: 476-84; November 1949.

41. SPLAVER, SARAH. *Opportunities in Vocational Guidance.* New York: Vocational Guidance Manuals, 1949. 104 p.
42. STONE, JAMES C. "Credentials for Personnel Services—Pro and Con." *California Journal of Secondary Education* 25: 48-52; January 1950.
43. THOMAS, W. CRAIG. "Guidance Duties of a Teacher." *California Journal of Secondary Education* 24: 237-42; April 1949.
44. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *Administrative Relationships of the Guidance Program.* Misc. 3314-8. Washington, D. C.: the Agency, July 1949. 24 p.
45. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *Counselor Competencies in Analysis of the Individual.* Misc. 3314-4. Washington, D. C.: the Office, July 1949. 31 p.
46. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *Counselor Competencies in Counseling Techniques.* Misc. 3314-5. Washington, D. C.: the Office, July 1949. 21 p.
47. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *Counselor Competencies in Occupational Information.* Misc. 3314-3. Washington, D. C.: the Office, March 1949. 28 p.
48. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *Duties, Standards, and Qualifications of Counselors.* Misc. 3314-1. Washington, D. C.: the Office, February 1949. 7 p.
49. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *In-Service Preparation for Guidance Duties, Part II.* Misc. 3314-7B. Washington, D. C.: Superintendent of Documents, Government Printing Office, May 1950. 41 p.
50. U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY. *In-Service Preparation for Guidance Duties, Part I.* Misc. 3314-7A. Washington, D. C.: Superintendent of Documents, Government Printing Office.
51. UTAH STATE DEPARTMENT OF PUBLIC INSTRUCTION, GUIDANCE SERVICES DIVISION. *Attitudes Toward the Counselors Certificate.* Salt Lake City: the Department, 1949. 6 p. (Mimeo.)
52. WILCOX, JAMES E. *A Study of Guidance Duties Personally Performed by the Principals of Secondary Schools in Second-Class Cities of Kansas.* Master's thesis. Emporia, Kansas: Kansas State Teachers College, 1947. 62 p.
53. WOELLNER, ROBERT C. "Training and Certification of School Counselors." *School Review* 58: 6-9; January 1950.
54. WOELLNER, ROBERT C., and WOOD, M. AURILLA. *Requirements for Certification of Teachers, Counselors, Librarians, Administrators for Elementary Schools, Secondary Schools, Junior Colleges, 1950-51.* Fifteenth Edition. Chicago: University of Chicago Press, 1950. (Pages unnumbered.)
55. WRENN, C. GILBERT. "The Basis of Training for Personnel Work." *Journal of Higher Education* 19: 259-61; May 1948.
56. WRENN, C. GILBERT. "Home Economist as Counselor." *Journal of Home Economics* 42: 23-24; January 1950.

Index to Volume XXI, No. 2

Page citations are made to single pages; these are often the beginning of a chapter or section of running discussion dealing with the topic.

Acceleration, 93
Achievement, prediction of, 121
Adjustment, 78
Adult education, characteristics of adults, 149
Anecdotal records, 86
Aptitude tests, 115, 120
Armed forces, guidance in, 110
Attendance, 90

College, costs, 151; enrolment, 151
Counseling, 132; certification, 162; in college, 109; directive vs. nondirective, 133; effectiveness, 135, 163; in the elementary school, 107; in industry, 109; qualifications for, 163; in the secondary school, 108; technics, 132; trends, 136
Cumulative records, 86

Delinquency, 95
Drop-outs, 89, 150

Emotional adjustment, 78
Employment, statistics, 152
Enrolment, college, 88; elementary school, 87; prediction, 87; private schools, 88; secondary school, 87; statistics, 149; trends, 87
Exceptional children, 93
Extracurricular activities, 140

Factor analysis, 76
Failure, 92
Family relationships, 80

Gifted children, 96
Group dynamics, 80
Group guidance, 140; technics, 141
Group therapy, 144
Growth and development, 75
Guidance, in the armed forces, 110; in college, 109; in the elementary school, 106; thru groups, 140; in industry, 109; personnel, 106, 108, 141, 159; preparation, 159, 161; programs, 86, 106, 140, 160; in the secondary school, 107; staff participation in, 86; training standards, 160; of veterans, 110

Handicapped children, 78, 93
Holding power of schools, 89

Intelligence, growth of, 76
Intercultural education, 79, 140, 143
Interest inventories, 120
Interests, 79
Interview technics, 116

Leadership, 142; in discussion groups, 143
Literacy, 149

Mental development, 76
Mentally retarded, 96
Methods, in special education, 97
Migration, of workers, 152
Motor development, 75

Occupations, census statistics, 152; trends, 155

Personality, 76; inventories, 117; measurement of, 115; and social status, 116
Personnel records, 86
Personnel selection, 124
Physical growth and development, 75
Physical handicaps, 93
Prediction of achievement, 121
Projective technics, 115, 118
Promotion policies, 92
Psychodrama, 142
Psychotherapy, 132, 140

Records, personnel, 86
Role-playing, 142

Social adjustment, 78
Social status, and behavior, 79; measurement of, 120; and personality, 116; and social acceptance, 116
Sociodrama, 142
Sociometry, 117, 142
Special education, 78, 94; methods and materials, 97

Tests, aptitude, 115, 120; of interests, 120; personality, 115
Truancy, 91

Veterans, guidance, 110
Vocational education, 151; selection, 122
Vocational guidance, of handicapped, 97

THIS issue of the REVIEW was prepared by the
Committee on the Curriculum: Learning and Teaching

WILLIAM H. BRISTOW, *Chairman*, Board of Education, New York, New York
WILLIAM G. BRINK, Northwestern University, Evanston, Illinois
ARTHUR W. GILBERT, Public Schools, Kansas City, Missouri
J. MINOR GWYNN, University of North Carolina, Chapel Hill, North Carolina
MANLEY E. IRWIN, Board of Education, Detroit, Michigan
GORDON N. MACKENZIE, Teachers College, Columbia University, New York, New York
HENRY J. OTTO, University of Texas, Austin, Texas
WILLIAM C. TROW, University of Michigan, Ann Arbor, Michigan

with the assistance of

CLIFFORD BEBELL, Columbia University, New York, New York
JOHN X. JAMRICH, Northwestern University, Evanston, Illinois
DONALD MCDONALD, University of Texas, Austin, Texas

FOREWORD

This issue of the Review was planned and initiated under the leadership of the retiring editorial board. The Association is indebted to Harry A. Greene for his three years of efficient service as editor and chairman of the editorial board, and to Albert N. Hieronymus as assistant editor. In taking up, with this issue, responsibilities for the Review, the new editorial board has had the benefit of the leadership of the retiring editor. Its mission will succeed if the same level of workmanship can be maintained.

The subject of this number, "The Curriculum: Learning and Teaching," has been covered previously in the following issues: Vol. I, No. 1; Vol. IV, No. 2; Vol. VII, No. 2; Vol. XII, No. 3; Vol. XV, No. 3; and Vol. XVIII, No. 3.

The committee, under the chairmanship of William H. Bristow, has operated under considerable difficulties due to illness and other circumstances interfering with its work. This prevented the completion of a chapter, originally planned for the issue, on evaluation and research technics related to the curriculum.

The work on this document was accomplished during a period of great international stress. It was begun just before the outbreak of hostilities in Korea. It may very well be that ensuing circumstances will bring about new phases, new emphases, in researches bearing on the curriculum in later issues on this subject. For the most part, the material covered herein reflects an assumption of pre-Korean, post-World War II stimulation of activity in this field, the beginnings of a development which might or might not continue. The material shows considerable interest in the social aspects of the curriculum with particular emphasis upon "life adjustment education," "citizenship education," and processes of curriculum development—all characteristic of attempts of the profession to "square up" for an era of peaceful living in a democratic society. References include a number of substantial publications which attempt syntheses in the very complex field of the curriculum—another mark of professional reorientation after World War II. As noted in previous treatments of this subject, the emphasis on process, the emphasis on meanings, the emphasis on perspective, has continued a trend away from experimental studies on curriculum and method, tho there is evidence in this issue that the profession is mustering its research competencies to a rigorous evaluation of theory. There is no means of determining whether this is a trend, that is, a development with implications for the future. It is evident, however, that students in the field are attempting to orient their efforts to a society which clearly has a terrific impact on problems of learning and teaching.

Francis G. Cornell, *Editor*
Review of Educational Research

CHAPTER I

Philosophy, Goals, and Social Factors

J. MINOR GWYNN

MAJOR emphases in research in this area might be classified as of five types: (a) studies of objectives and goals thru the school-child-parent-teacher approach in an individual community; of this sort are the reports by Del Solar (24), Jersild and his associates (45, 46), and by Featherstone (29); (b) studies of the place of moral and religious values in the curriculum (14, 16, 41, 42, 47, 55, 60, 65, 68, 73, 82); (c) research by national groups into the philosophy, objectives, and values of the curriculum; representative of this type are reports from the American Academy of Political and Social Science (3), American Association of School Administrators (4), the Educational Policies Commission (66), Cooperative Study of Secondary-School Standards (20), American Federation of Teachers (51), Stanford Social Education Investigation (76), and the Life Adjustment Education for Youth reports (25, 44, 83); (d) studies of the community—its relationships and joint responsibilities in the formulation of goals and curriculums for the schools (23, 51, 52, 56, 64, 69, 72); and (e) scholarly treatises in book form which have collected, analyzed, and presented a great amount of the research that has been done on aspects of the curriculum in the last quarter of a century; B. Othanel Smith and others (81), and Gwynn (39) try to encompass the whole curriculum field in its various aspects, while Fay Adams (2) and Lee and Lee (53) cover the elementary level, and Featherstone (29) sticks to the secondary-school curriculum.

The effort is made in this chapter to bring together into one place the significant research which pertains to the objectives and goals of the school curriculum and to those factors which influence the curriculum and curriculum change, particularly the community. This objective is unusually difficult, chiefly because of the unusually large number of studies and publications during the last three years. In attempting to do this, care had to be exercised not to duplicate unnecessarily the research which has already been reported in previous issues of the REVIEW (*e.g.*, "The Social Framework of Education," Volume XIX, No. 1, February 1949; "Education for Work, Citizenship, and Leisure," Volume XX, No. 4, October 1950; and "Growth and Development," Volume XX, No. 5, December 1950). Therefore, this section does not cover such important items as studies of social class in child development and the curriculum; major aspects of democratic, intercultural, and international education; economic life as a major factor in the shaping of the curriculum; and certain reports of recent significant social science investigations.

Factors Influencing Curriculum

Prominent now, as in the past, are sociological and social factors in the formulation of the curriculum. These cover a wide range, from the teaching of controversial issues in the classroom (84) to the acquisition of modern education thru current affairs (17). How the teacher can recognize controversial questions and help the student to develop the ability to analyze them formed the basis of Wilhelm's approach (84). He suggested definitely six plans of group approach, involving the development of leadership in this problem area. Clark (17) reported on the best technics in the teaching of current affairs found by three teachers in their visits to a representative cross section of the school systems of the country; these teachers actually observed the teaching of current affairs in the classroom, noted both effective and noneffective methods in use, and talked with various school personnel about the problem. Berninghausen (8) tackled the problem of controversial issues from a different angle when he showed that libraries must buy and circulate all types of books and periodicals if the seeker after knowledge is to have access to alternative viewpoints and the right to learn in an unbiased atmosphere. The Philadelphia Open-Mindedness Study, described by Everett (28), was an attempt to apply the scientific problem-solving method to the combat against prejudice. Teachers in 11 Philadelphia public schools worked together, and with their pupils, to solve real problems in their communities and classrooms.

Gruenberg (38) focused attention historically upon the home and school as sociological partners in the gradual development of sane ways to teach sex education. Continued major emphasis in social education was given to those activities under the control and supervision of the school which help to improve human relations. A good illustration of this point of view, well documented, was presented by Quillen and Hanna (76), based upon the Stanford Social Education Investigation. Human rights and human relations were also the basis for two recent bulletins of the National Council for the Social Studies. Crary and Robinson (21) analyzed the issues, the teaching problems, and the teaching concept in a resource unit in the area of civil liberties and rights. Cummings (23) has gathered together an anthology, primarily based on human relations in the curriculum and in the total school program; both content and method are included.

Evidence of the continued effect of the economic factor on the curriculum was presented by Carmichael (15), who gave data and practical plans for basic business education for all youth in their general education; by Willcockson (62) in the consumer, vocational, and economic experiences suggested for study in the kindergarten and primary grades; by Smith, Stanley, and Shores (81) as one of four major factors in their social diagnosis for curriculum development; and by Gwynn (39) as one of his important factors affecting curriculum development.

The effect of nationally organized groups of various types upon curriculum philosophy continued. The American Academy of Political and Social Science devoted a recent issue (3) to "Critical Issues and Trends"; it covered, with its usual completeness, education in relation to the present world order and the American democratic concept, support and control of schools, social and population change, the program for the various age levels, adult education, and the citizen and his schools. In addition to the Stanford Social Education Investigation (76), professional education groups have produced some significant reports which operate as important factors in curriculum change.

The American Association of School Administrators in its Twenty-Sixth Yearbook (5) collected in one place most of the ideas as to the limits of public education for the masses, from the nursery school thru adult education, including the education of exceptional children and the enrichment of the present curriculum. The Educational Policies Commission (66) presented its carefully worked out, long-range plan for the education of the elementary-school child; the program was based on research, conferences, and visitations to 84 elementary schools in a wide variety of communities and regions. Another strong influence on curriculum philosophy has been the reports and studies on Life Adjustment Education for Youth (25, 44, 83), which will be analyzed under a later section of this chapter.

Values

One way to discover values is to obtain opinions from people in regard to them. Elsie Adams (1) wanted to learn what the pupils in an elementary school expected the school to do for them, what they thought made a good school, and how they would plan a good school for boys and girls. The answers of the students showed clearly that they recognized certain values that some teachers perceived only dimly. Fay Adams (2) found units of work in the various school subject areas to be curriculum values for both the child and the teacher in the broader view of teaching method. Lee and Lee (53) went further: they centered the curriculum for the elementary-school pupil around experiences valuable to the child; prominent among the values centered around experiences in the traditional subjectmatter areas was the development of the more recently recognized ones, such as success, security, recognition, acceptance, status with one's peers, contact with reality, and adventure.

Smith, Stanley, and Shores (81) contend that values are the rules of conduct by which people ". . . shape their behavior and from which they derive their hopes." They contributed richly to curriculum values by tracing the American value-system, by illustrating the contradictory rules in this value-system, and by showing the social effects of confusions in our value-system and the need for a new kind of subjectmatter. Tho he based his functional curriculum for youth upon analyses of the needs of youth and of society, Featherstone (29) made no distinction between needs and values; his needs as motives and needs as qualities correspond to what others call values.

The Cooperative Study of Secondary-School Standards has contributed again to research, in its two-year preparation and publication of the 1950 edition of *Evaluative Criteria* (20). The educational needs of the youth in a given school community are the values (standards) which are used by both the self-evaluating and the visiting committees to evaluate the work and program of the school.

Human values in the curriculum have already been noted in the research by Crary and Robinson (21), Cummings (23), Everett (28), Willcockson (62), and Berninghausen (8). The study by the American Council on Education of intergroup relations in teaching materials in textbooks (6) likewise laid emphasis on human relations.

On the high-school level, a good job of research into youth's opinions of the curriculum was done by Grim and Anderson (37). They sampled a total of 271 students in one large high school in each of five states; they compared the opinions of these youth with those of 36 outstanding leaders in the field. The results showed some interesting similarities of opinion, and some significant differences. Oliver's study (70) with a jury of 86 administrators indicated three of five major value areas to receive primary attention in small high schools, namely, the areas of personal problems, larger social relationships, and appreciations and discriminations.

The 1949 Yearbook of the Association for Supervision and Curriculum Development (7) gave major attention to seven aspects of better teaching, most of which are a part of or are closely connected with curriculum values. These are: (a) fostering security and satisfaction, (b) promoting cooperative learning, (c) helping pupils develop self-direction, (d) fostering creativity, (e) helping pupils develop values, (f) providing opportunities for social action, and (g) helping pupils evaluate learnings.

Cremin (22) reported on the meaning and values of the social class system in the United States, as set forth in seven research publications under the general direction of Lloyd Warner and his associates at Chicago. He defined social class, indicated the five class levels that exist and are recognized, and showed that social mobility does take place in the class structure. More attention could have been devoted to the impact of the social class system upon youth, their development, and their curriculum program.

So much was produced during this period on moral, ethical, and religious values that the following section is devoted solely to those aspects.

Religion and Morals

The controversy continued to rage over whether religion has a place in secular education. There are those who take the position that sound modern education and the development of good morals are inseparable. Childs (16) propounded the thesis that America's formation of the patterns for a new civilization is primarily a moral task; for this task, he emphasized that *method* in education is three-fold—psychological, pedagogical, and moral. A similar point of view was presented by Hay (41), whose data argue for religion, or ethics, as the basis of a broad culture. Hay contended that, in the wider diffusion of education, the emphasis has shifted to the findings and methods of material science at the expense of basic moral aims. He considers character and moral education to be the same. Mason (60) supported the point of view that material science constitutes a sound, secular moral base for public education. His study traced values and public education with the emergence of the secular school in America. He then followed the development of those movements in education identified as essentialism, traditionalism, individualism, and naturalism. He concluded that the scientific, secular base for public education is the main safeguard for American religious and political liberties; and he stressed the development of critical intelligence in youth as the primary task of the schools.

Others take the position that religion should be studied objectively as a part of our culture, that this study should be done under the direction of the public schools, and that the aims would be to make youth literate in regard to religion and thus better able to tackle and solve religious and moral problems. With the help of some 300 educators and religious leaders, Henry (42) made a study of types of curriculum programs and practices in both public and private schools thruout the country. His purpose was to present in book form basic guidance to any community which wanted to try out an objective study of religion in the public schools. Included were information and suggestions on planning, curriculum proposals, matters of policy, selection and training of teaching personnel, community preparation, and improvement with experience. Johnson (47) was in agreement with this position.

The continued separation of church and state is maintained by others, with the conviction that the school should continue to foster ethical, esthetic, and character education with emphasis upon human values. This concept was explored by Thayer (82), Norton (68), and the Twenty-Sixth Yearbook (65) of the NEA Department of Elementary School Principals on spiritual values in the elementary school.

The history of the constitutional and statutory provisions concerning religion and education were presented ably by Butts (14) and O'Neill (73); the latter felt that the matter was primarily one of civil liberties. Gwynn (39) analyzed the issues involved in the problems of religion in education, of character education, and of intergroup and human interaction. Students of character education should read carefully Ligon's description (55) of the results of 10 years of study in the Union College Character Research Project.

The Community

Many studies and reports during the last three years have focused attention upon the community as a major factor in the development of curriculum goals and philosophy. Bolzau and Stevenson (10) reported the cooperative experiment in Girls High School of South Philadelphia in which two social studies teachers, the school administration, and various agencies and businesses worked out a plan for school credit based on actual work experience of some 30 to 45 hours a semester. Nelson's study (67) of 300 high schools in every state and Alaska indicated that only one of every 50 students in high school was obtaining any experience in community service; field work of this type was considered desirable, and school credit should be granted for it.

Experiments and studies in cooperative curriculum planning were reported by Fox (31) in Chautauqua County (N.Y.) with emphasis upon cooperative social planning for a functional curriculum based upon research into the life of the local community; by Ernest Osborne (74), who insisted upon careful preplanning for family life education by parents, children, and community leaders with the school; by Gans (34), who studied the plan of groups of parents and lay people, teachers, and administrators working as teams to develop programs in elementary education; by Mackenzie (59), who reviewed assumptions and goals in community cooperation in curriculum planning and indicated some areas in which the community educates automatically and others in which it educates effectively only with the aid of the school or of other agencies; by Krug (52), who indicated that the main problem in curriculum planning is how we can get educational leaders, teachers, lay people, children and youth to work together in determining the purposes of education and in the improvement of educational procedures and materials; and by the Metropolitan School Study Council (61) and the NEA Department of Elementary School Principals in its Twenty-Eighth Yearbook (64), which stressed the leadership of the administrator in getting teachers, parents, pupils, community agencies and the general public together in cooperative curriculum planning.

Continuing a well-defined trend of the last 20 years, other studies showed the value of the school as the center of the community and of all types of community living. Mainly of this type were the reports of Garstin (35), Lund (57), Clark (18), Dresden (27), and the National Association of Secondary-School Principals (50) in a part of their report on how to develop public relations thru school and community agencies.

Valuable research was reported on the training of community leaders and on the development of individual and group skills in group discussion. Lippitt (56) set forth the use of research technics of social science in the task of training community leaders to deal effectively with the problems of intergroup relations. Cooperating in this experiment were Michigan University's Research Center for Group Dynamics, the Commission on Community Interrelations of the American Jewish Congress, and the Connecticut Interracial Commission. The American Association of School Administrators (4) analyzed the types and workings of cooperative community leadership. The Metropolitan School Study Council (61) also studied educational dynamics as a part of their cooperative research.

Fontaine (30) reported on the experiment in Great Neck, Long Island, where community experts who were natural teachers were brought into school classes and other community experts were persuaded to serve on special committees which were concerned with long-range school planning.

Not to be overlooked are those valuable compilations of experiences which illustrate the community approach in curriculum work. Jean and Jesse Ogden (69) continued their work in Virginia and reported on their five-year experiment in community development, including later evaluations of earlier experiments. Edward Olsen compiled another case book (72) of school and community programs, samples ranging from the kindergarten to adult education. Lloyd and Elaine Cook (19) published their sociological approach to education, a case book with emphasis upon the group-work method and approach and the development of teacher-leader skills in specific situations. The community approach to the curriculum was emphasized in the Educational Policies Commission's curriculum blueprint for the elementary school (66), by Gwynn (39), by Smith, Stanley, and Shores (81), by Krug (52), and by the Association of Secondary-School Principals in its report (32) on programs for improved living in secondary schools as developed with the stimulation of the Sloan Experiments in Applied Economics. Both Childs (16) and Hay (41) contend that the local schoolboard, in the individual community, can practically control what is taught in the schools, and that actual experiences in living together are necessary for the youth to acquire the common way of living in America's complex society today.

Objectives and Goals

Goals are hard to distinguish from values. Some writers really make no distinction between them. Curriculum goals may be derived from various sources—from the opinions of pupils, from the philosophy and opinions of adults, and from experimental data.

Friedman (33) conducted a study in a senior civics class which asked both pupils and parents what should be taught. One interesting result was that parents rather than pupils thought that topics of a general nature would be of more value to the pupils; both thought that pupils should learn what would help them in life. Oliver (70, 71) made a nationwide study of curriculum needs, basic goals, and practices of small high schools with enrolments of less than 200. He listed the 12 most important objectives in high-school curriculums as rated by a "field jury" of 86 principals and superintendents and, contrasted with these 12, the 12 practices found most commonly in high schools. The difference in theory and practice is interesting; he concludes that many small high schools are tied down by the traditional approach to secondary education and that these small high schools should give more time to analysis of the problems of youth and life adjustment education. Goals are also derived from the philosophy, thought, and opinions of individual adults and groups of people. The American Academy of Political and Social Science (3) gave large space to the goals of education in the present world order and the crisis in the United States today. The Twenty-Sixth Yearbook of the American Association of School Administrators (5) explored the possible limit of the goals of public education for the masses. The National Council of Independent Schools (63) felt that it was imperative to go on record concerning the values for which it stands and concerning the function of all secondary education in the United States. The American Federation of Teachers (51) issued a report on goals for American education. Among their seven goals, they listed two which are not included in the 10 imperative needs of youth or in the seven cardinal principles; these are the duty of the school to close the gap between scientific advance and social retardation and the goal of the school to expand interest in international cooperation and peace. However, most of the rest of the report made a good case for goals for American teachers, rather than for goals for American education. Leipold (54) obtained 500 parents' views on school practices and goals in Nokomis Junior High School at Minneapolis. Results showed that parents wanted the schools to keep abreast of the times, but did not want a too rapid, unexplained change.

General education as a curriculum objective came in for its share of investigation. Carmichael (15) examined it from the standpoint of including business education for all youth. The Educational Policies Commission's recommendations (66) for the educational program for the elementary school projected the elementary school of the future from 1948 to 1958; it laid emphasis upon the school as a place for excellent living. The newer movement for Education for Life Adjustment received ample attention in the scheme of general education. Hull (44) and the U. S. Office of Education publication (83) described both the history of the movement started by the Prosser Resolution and the goals of life adjustment education for the neglected 60 percent. Gaumnitz (36) presented some administrative blocks to the life adjustment movement. Douglass and his collaborators (25) claim that life adjustment education can be implemented within the present framework of the secondary school and within the present curriculum program and subjectmatter areas; they also set forth the philosophy and objectives of this program in theory and in practice. The volume marks the beginning of study and research in this area, in spite of the fact that only two of the authors are public school men. Jones (48) emphasized the common learnings program in his high school of the future.

The struggle of the 1920's and '30's between the "progressives" and the essentialists was thrown into clearer perspective by Brickman (12), who analyzed the 1938-1948 decade of essentialism; by Redefer (77), who gave credit to progressive education for improved methods of teaching to attain the goals of the curriculum, centered primarily around the development of the whole child in a desirable and natural learning situation; and by Bode

(9), who covered again the scientific method versus theology in teaching and aims. Experience as subjectmatter, or as an aim in education, was analyzed by Shane (80); certain criteria were developed which could prove useful to a teacher in planning a course on the experience pattern. Attention has already been called to Child's work (16) on morals as curriculum goals.

Curriculum objectives were analyzed in different sections of their books by Smith, Stanley, and Shores (81), by Lee and Lee (53), by Fay Adams (2), by Krug (52), and by Gwynn (39).

Objectives derived from experimental data included several outstanding contributions. Havighurst (40) reported the findings of the University of Chicago's Committee on Human Development. In effect, he defined the goals of education as helping individuals to achieve certain developmental tasks at six periods in the life span. The influence of this Chicago report was also evident in Brooks' report of the attempt to integrate books and reading with developmental tasks thru a highly selective list of titles. The National Association of Secondary-School Principals (32) described experiments in providing programs for improved living.

Three recent cooperative studies of the Horace Mann-Lincoln Institute of School Experimentation (43) added valuable data to the determination of goals thru the study of children's interests and the dependence of these interests upon the particular experiences that children have had. Jersild and associates (45) studied the joys and problems of child rearing, and presented their findings of the satisfaction of adults from bearing and rearing children, their problems with their children, and their hopes for them. Jersild and Tasch (46) reported on the Springfield Cooperative Study of Children's interests, using the Interest Finder which had simple questions centered around children's wishes, likes, and dislikes; Grades I-XII were involved. Del Solar (24) made a comparative study of parents' and teachers' appraisals of children; perhaps one of the most significant indications of this study was that the roles of the home and school overlap to such an extent that the school cannot minister to all aspects of the training and welfare of the "whole" child.

In an earlier section in this chapter, space was devoted to the studies of various people and groups on "values," some of which included goals. Of this type were those of Elsie Adams (1), Grim and Anderson (37), Featherstone (29), and the Cooperative Study of Secondary-School Standards (20).

Curriculum Complex

Research in this area involved some items difficult to classify. Two studies of legal control of education involved the curriculum. Keesecker (49) analyzed the laws of the various states pertaining to required instruction in the curriculum and matters concerning American freedom. Remmlein (78) included in her school-law text a study of statutory provisions and court interpretations of state courses of study, or board of education curriculum regulations, as well as the legal aspects of textbook adoption, purchase, and content or bias. Wright and Barker (86) studied zones of influence on the behavior of children in a community. Both Draper (26) and McNally (58) developed the thesis that research and experimentation are the responsibility of each teacher and each school. The successful development of programs of family life education in Illinois was traced by Ruth Osborne and Kirkendall (75). A provocative report was made by Robinson (79) on student participation in school administration and activities in an industrial school for boys who were all behavior problems. The Committee on the Study of Teaching Materials in Intergroup Relations of the American Council on Education completed its impartial survey and evaluation (6) of 315 textbooks prepared especially for instructional use. Brickman (11) made his usual valuable contribution in reviewing 21 recent publications pertaining to educational sociology. The increasing importance of the role of reading in regard to youth development and school progress was demonstrated by Witty (85) in the National Society for the Study of Education's Forty-Seventh Yearbook.

Bibliography

1. ADAMS, ELSIE W. "Children State Their Educational Philosophy." *Educational Leadership* 6: 240-42; January 1949.
2. ADAMS, FAY. *Educating America's Children.* New York: The Ronald Press Co., 1946. 490 p.
3. AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE. "Critical Issues and Trends in American Education." *The Annals of the American Academy of Political and Social Science* 265: 1-172; September 1949.
4. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *Community Leadership.* Washington, D. C.: the Association, a department of the National Education Association, 1950. 24 p.
5. AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS. *The Expanding Role of Education.* Twenty-Sixth Yearbook. Washington, D. C.: The Association, a department of the National Education Association, 1948. 484 p.
6. AMERICAN COUNCIL ON EDUCATION. *Intergroup Relations in Teaching Materials: A Survey and Appraisal.* Washington, D. C.: American Council on Education, Intergroup Education Project, 1949. 231 p.
7. ASSOCIATION FOR SUPERVISION AND CURRICULUM DEVELOPMENT. *Toward Better Teaching.* 1949 Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. 282 p.
8. BERNINGHAUSEN, DAVID K. "On Keeping Our Reading Free." *Educational Leadership* 6: 104-108; November 1948.
9. BODE, BOYD H. "Pragmatism in Education." *New Republic* 121: 15-18; October 17, 1949.
10. BOLZAU, EMMA L., and STEVENSON, EMILY D. "Volunteer Student Social Service Project." *Social Education* 13: 237-38; May 1949.
11. BRICKMAN, WILLIAM W. "Educational Sociology." *School and Society* 68: 74-79; July 31, 1948.
12. BRICKMAN, WILLIAM W. "Essentialism Ten Years After." *School and Society* 67: 361-65; May 15, 1948.
13. BROOKS, ALICE R. "Integrating Books and Reading with Adolescent Tasks." *The School Review* 58: 211-19; April 1950.
14. BUTTS, ROBERT FREEMAN. *The American Tradition in Religion and Education.* Boston: Beacon Press, 1950. 230 p.

15. Carmichael, Vernal H. "Business Education for All American Youth." *NEA Journal* 38: 588-89; November 1949.
16. Childs, John L. *Education and Morals.* New York: Appleton-Century-Crofts, 1950. 299 p.
17. Clark, Delbert, editor. *Current Affairs and Modern Education: A Survey of the Nation's Schools.* New York: The New York Times Co., 1950. 278 p.
18. Clark, Lois "A Central School Serves Its Community." *NEA Journal* 37: 276-77; May 1948.
19. Cook, Lloyd A., and Cook, Elaine F. *A Sociological Approach to Education: A Revision of Community Backgrounds of Education.* Second edition. New York: McGraw-Hill Book Co., 1950. 514 p.
20. Cooperative Study of Secondary-School Standards. Evaluative Criteria. 1950 edition. Washington, D. C.: Cooperative Study of Secondary-School Standards (744 Jackson Place), 1950. 305 p.
21. Crary, Ryland W., and Robinson, John T. *America's Stake in Human Rights.* Bulletin No. 24. Washington, D. C.: National Council for the Social Studies, a department of the National Education Association, 1949. 51 p.
22. Cremin, Lawrence A. "Some Are More Equal than Others." *Progressive Education* 27: 97-100; February 1950.
23. Cummings, Howard H., editor. *Improving Human Relations.* Bulletin No. 25. Washington, D. C.: National Council for the Social Studies, a department of the National Education Association, 1949. 158 p.
24. Del Solar, Charlotte. *Parents and Teachers View the Child.* New York: Teachers College, Columbia University, 1949. 119 p.
25. Douglass, Harl R., Editor. *Education for Life Adjustment.* New York: The Ronald Press Co., 1950. 491 p.
26. Draper, Edgar M. "Curriculum Research: Biggest Responsibility of Every Teacher." *The Clearing House* 24: 387-92; March 1950.
27. Dresden, Katherine W., and Stegeman, William H. "When School and Community Get Together." *The Clearing House* 25: 22-25; September 1950.
28. Everett, Samuel. "Teachers Combat Prejudice." *NEA Journal* 37: 216-17; April 1948.
29. Featherstone, William B. *A Functional Curriculum for Youth.* New York: American Book Co., 1950. 276 p.
30. Fontaine, Andre. "Everybody's School." *National Parent-Teacher* 44: 10-13; September 1949.
31. Fox, Lorene K. *The Rural Community and Its School.* New York: King's Crown Press, 1948. 233 p.
32. French, Will, editor. *Secondary School Programs for Improved Living.* Bulletin No. 155. Washington, D. C.: National Association of Secondary-School Principals, a department of the National Education Association, May 1948. 188 p.
33. Friedman, Kopple C. "Utilizing the Community in Curriculum Development." *School Review* 56: 357-60; June 1948.
34. Gans, Roma. "How To Improve Community Relations in Elementary Curriculum Planning." *Progressive Education* 27: 140-43; March 1950.
35. Garstin, L. H. "The School as an Integrating Agency in Community Life." *Journal of Educational Sociology* 21: 409-16; March 1948.
36. Gaumnitz, Walter H. "'Road Blocks' to Life Adjustment Education." *School Life* 32: 19-20, 22; November 1949.
37. Grim, Paul, and Anderson, Vernon. "Is the American High School Serving Today's Youth?" *Educational Leadership* 6: 338-49; March 1949.
38. Gruenberg, Sidonie M. "Sex Education Today." *Child Study* 26: 99-100, 116; Fall 1949.
39. Gwynn, John Minor. *Curriculum Principles and Social Trends.* Revised edition. New York: Macmillan Co., 1950. 768 p.
40. Havighurst, Robert J. *Developmental Tasks and Education.* Chicago: University of Chicago Press, 1948. 86 p.
41. Hay, Clyde Lemont. *The Blind Spot in American Public Education.* New York: Macmillan Co., 1950. 110 p.
42. Henry, Virgil. *The Place of Religion in Public Schools: A Handbook To Guide Communities.* New York: Harper and Brothers, 1950. 164 p.
43. Horace Mann-Lincoln Institute of School Experimentation. "A Progress Report." *Teachers College Record* 49: 305-62; February 1948.

44. HULL, JOHN DAN. *A Primer of Life Adjustment Education.* Chicago: American Technological Society, 1949. 30 p.
45. JERSILD, ARTHUR T., and OTHERS. *Joys and Problems of Child Rearing.* New York: Teachers College, Columbia University, 1949. 235 p.
46. JERSILD, ARTHUR T., and TASCH, RUTH J. *Children's Interests and What They Suggest for Education.* New York: Teachers College, Columbia University, 1949. 173 p.
47. JOHNSON, FREDERICK ERNEST. "The Role of Religion in General Education." *Teachers College Record* 51: 222-32; January 1950.
48. JONES, GALEN. "The High School of the Future." *Teachers College Record* 50: 451-56; April 1949.
49. KEESECKER, WARD W. *Education for Freedom as Provided by State Laws.* U. S. Office of Education, Federal Security Agency, Bulletin 1948, No. 11. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1948. 38 p.
50. KINDRED, LESLIE W., editor. *Public Relations in Secondary Schools.* Bulletin No. 152. Washington, D. C.: National Association of Secondary-School Principals, a department of the National Education Association, 1948. Part IV, "School and Community Agencies," p. 202-66.
51. KIRKENDALL, LESTER A.; KUENZLI, IRVIN R.; and REEVES, FLOYD W. *Goals for American Education.* Chicago: American Federation of Teachers, 1948. 130 p.
52. KRUG, EDWARD A. *Curriculum Planning.* New York: Harper and Brothers, 1950. 306 p.
53. LEE, JONATHAN MURRAY, and LEE, DORRIS MAY. *The Child and His Curriculum. Second edition.* New York: Appleton-Century-Crofts, 1950. 710 p.
54. LEIPOLD, L. E. "500 Parents' Views on School Practices." *The Clearing House* 25: 19-21; September 1950.
55. LIGON, ERNEST M. *A Greater Generation.* New York: Macmillan Co., 1948. 157 p.
56. LIPPITT, RONALD. *Training in Community Relations.* New York: Harper and Brothers, 1949. 286 p.
57. LUND, SVEN E. TORSTEN. *The School-Centered Community.* New York: Anti-Defamation League of B'nai B'rith, 1949. 42 p.
58. MCNALLY, HAROLD J. "Experimentation in Elementary Schools: Hothouse Plant or Hardy Perennial?" *Teachers College Record* 51: 520-27; May 1950.
59. MACKENZIE, GORDON N. "Community Cooperation in Curriculum Planning." *Teachers College Record* 51: 347-52; March 1950.
60. MASON, ROBERT E. *Moral Values and Secular Education.* New York: Columbia University Press, 1950. 155 p.
61. METROPOLITAN SCHOOL STUDY COUNCIL. "A Progress Report." *Teachers College Record* 50: 1-59; October 1948.
62. NATIONAL COUNCIL FOR THE SOCIAL STUDIES. *Social Education for Young Children.* Curriculum Series: No. 4, revised edition. Washington, D. C.: the Council, a department of the National Education Association, 1950. 120 p.
63. NATIONAL COUNCIL OF INDEPENDENT SCHOOLS "The Functions of Secondary Education in the United States." *School and Society* 72: 193-95; September 23, 1950.
64. NATIONAL EDUCATION ASSOCIATION, DEPARTMENT OF ELEMENTARY SCHOOL PRINCIPALS. *The Public and the Elementary School.* Twenty-Eighth Yearbook. Washington, D. C.: the Department, 1949. 347 p.
65. NATIONAL EDUCATION ASSOCIATION, DEPARTMENT OF ELEMENTARY SCHOOL PRINCIPALS. *Spiritual Values in the Elementary School.* Twenty-Sixth Yearbook. Washington, D. C.: the Department, 1947. 351 p.
66. NATIONAL EDUCATION ASSOCIATION AND AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS, EDUCATIONAL POLICIES COMMISSION. *Education for All American Children.* Washington, D. C.: the Commission, 1948. 292 p.
67. NELSON, RAYMOND. "Citizenship Laboratory." *School Review* 56: 156-62; March 1948.
68. NORTON, JOHN K. "Church, State, and Education." *NEA Journal* 38: 21-24; January 1949.
69. OGDEN, JEAN, and OGDEN, JESSE. *These Things We Tried: A Five-Year Experiment in Community Development.* University of Virginia Extension Bulletin XXV, No. 6, October 15, 1947. Charlottesville: University of Virginia, 1948. 432 p.

70. Oliver, Albert I. "Basic Goals for a Small High School: Theory and Practice." *The School Review* 58: 458-67; November 1950.
71. Oliver, Albert I. "The Objectives of a Small High School's Philosophy." *The School Review* 58: 139-46; March 1950.
72. Olsen, Edward G., editor. *School and Community Programs.* New York: Prentice-Hall, 1949. 510 p.
73. O'Neill, James M. *Religion and Education Under the Constitution.* New York: Harper and Brothers, 1949. 338 p.
74. Osborne, Ernest. "Guideposts for Family-Life Education." *NEA Journal* 39: 124-25; February 1950.
75. Osborne, Ruth Farnham, and Kirkendall, Lester A. "Family-Life Education in Illinois High Schools." *The School Review* 58: 516-26; December 1950.
76. Quillen, Isaac James, and Hanna, Lavone A. *Education for Social Competence.* Chicago: Scott, Foresman and Co., 1948. 572 p.
77. Redefer, Frederick L. "What Has Happened to Progressive Education?" *School and Society* 67: 345-49; May 8, 1948.
78. Remmlein, Madaline Kinter. *School Law.* New York: McGraw-Hill Book Co., 1950. 376 p.
79. Robinson, John T. "Students and Faculty Work To Improve Life in School." *The Journal of Educational Sociology* 21: 517-27; May 1948.
80. Shane, Harold G. "Experience as Subject Matter." *Progressive Education* 26: 126-49; March 1949.
81. Smith, B. Othanel; Stanley, William O.; and Shores, J. Harlan. *Fundamentals of Curriculum Development.* Yonkers: World Book Co., 1950. 780 p.
82. Thayer, V. T. *Religion in Public Education.* New York: The Viking Press, 1947. 212 p.
83. U. S. Office of Education, Federal Security Agency. *Life Adjustment Education for Every Youth.* Washington, D. C.: the Office, Division of Secondary Education, 1948. 122 p.
84. Wilhelms, Fred T. "Letter to a Teacher: On Controversial Questions." *Progressive Education* 26: 8-12; October 1948.
85. Witty, P. A. "Current Role and Effectiveness of Reading Among Youth." *Reading in the High School and College.* Forty-Seventh Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1948. p. 8-26.
86. Wright, Herbert F., and Barker, Roger G. "The Elementary School Does Not Stand Alone." *Progressive Education* 27: 133-137; March 1950.

CHAPTER II

Growth, Development, Learning, and Maturation as Factors in Curriculum and Teaching

WILLIAM C. TROW

In bringing together the diverse aspects of educational psychology indicated by the title of this chapter, and in focusing them on instructional practice, it would seem appropriate first to look for the hypotheses that lie behind both research and practice. The ideas embodied in these hypotheses can then be noted in the implications of the research that has been done. The treatment of this chapter will therefore concentrate on learning and the curriculum since growth and development are reviewed in a separate issue of this journal.

Hypotheses for Research and for School Practice Affecting Teaching and the Curriculum

The basic idea that underlies all the others in modern education is to be found in John Dewey's recurrent emphasis on the experience of the child as of central concern. Regard for his all-round development has shifted the emphasis from forcing him to acquire knowledge, to making provision for an inner living motivation (22). We cannot know what to teach, how to teach, or when to teach until we know whom we are teaching, and from what homes, groups, and cultures our students come, and until we can identify and project their current needs against the future needs of a dynamic society (55). If these things are to be done, man in general, and the pupil in particular, must be viewed not as a free soul, a capricious creature, but as a dynamic, lawful system interacting with the energy systems of the environment. Anderson (3) contrasted the effects on one's view of pupil capacity, motivation, practice, and transfer when man is viewed (a) as a "free soul" and (b) as a "dynamic lawful system." American psychology supports the latter under which there have been identified two basic systems of behavior and of learning, the association system and the field system.

If man is viewed as a dynamic lawful system, it means, first, that the individuals in a learning group must be perceived as a group of dynamically interactive personalities (27). Included in this perception will be what Snygg and Combs (69) called the "phenomenological" approach, which seeks to explain behavior on the basis of the behaver's perception of himself and of the world, and deal with it accordingly.

It means, second, that the objectives of education will include the development of attitudes toward other individuals and groups (50), but they must be "right" attitudes. Research is therefore needed on value concepts and their role and influence in social behavior (87). Modern education is actually reoriented toward human values (14), yet probably few teachers realize they are applying axiology when they try to answer a child's, "Why do we have to?" If axiology is viewed as the science of preferential behavior (53), the way is open for the coalescence of value concepts with those derived from the study of personality and referred to as needs.

The third implication of the view of man as a dynamic lawful system, then, is that the educator, in working out a curriculum to promote pupil learning, will be a student of the dynamics of normal personality. As expounded by Dollard and Miller (29) and others, knowledge of personality is derived from psychoanalysis, social psychology, and anthropology, from which areas light is being thrown on the nature of social motivation and drive, of fear and conflict, and on the cultural conditions of learning. Harsh and Shrickel (41) traced successive developmental stages which produce changes in motivation, ability, and learned adjustment patterns and which must be more adequately reflected in the school program. For example, Miller (56) found that rats learned to get relief from an electric shock by striking each other, and when alone they struck a celluloid doll. The rats, like the child in play who beats the "mamma doll," revealed the Freudian mechanism of displayed aggression, as would the child restricted by too narrow curriculum demands.

Kluckhohn and Murray (51) in one of the chapters in *Personality: In Nature, Society and Culture*, to which a number of authors have contributed, outlined their dynamic, organismic concept of personality. They see it as a continuity of functional forces and forms manifested thru sequences of organized integrative processes. Its functions, among others, are self-expression and the reduction of tensions and conflicts thru social conformity, identification, and the creation of a design for living that permits periodic and harmonious appeasement of most of the needs, and gradual progression toward distant goals.

If education is to profit from the empirical approach here indicated, as Bode (15) pointed out, it will have to accept Dewey's view (28) and abandon its hope for truth as conformity to an alleged immutable cosmic order. Money (57) suggested a kind of compromise in view of the fact that the difference between private delusions, widely accepted beliefs, and scientific facts, is one of actual or possible validation. Since some beliefs, referred to as absolutes, have eased psychosomatic existence, may they not be considered as axioms that might be changed in content by common agreement; thus satisfying the philosophical need for stability and also the scientific need for change? In any case, scientific method has a long way to go in the social realm before it will be able to keep the thinking even of trained minds out of the mental channels of the child, the primitive, and the psychotic. These channels of thinking were mapped in detail by Werner (85) as follows, each with its scientific opposite: the syncretic to the discrete, the diffuse to the articulated; the indefinite to the definite, the rigid to the flexible, and the labile to the stable.

Learning and the Curriculum

Since the relation of mental hygiene and guidance to the curriculum and teaching is not included in this issue of the REVIEW, suffice it to say with Wright (88) that two kinds of childhood needs should be differentiated: the normative as they are appreciated by the adult, and the psychological as felt by children. But since the child responds not to generalities but to specifics, it is important, if his basic needs are to provide effective motivation, that curriculum activities be cognitively well-structured so that the activities lead clearly to the goals sought.

Blair (11) indicated the nature of the psychologically effective curriculum as one which makes provision for varying maturity and experience levels, gears learning activities to pupil needs and goals, provides units of experience that have structure and meaning for the pupil, and selects and appraises projected pupil activities in terms of their transfer value to life situations. Brownell (19), however, pointed to the discrepancy between learning experiments and improvement in teaching, and called for long-term studies of the learning process in the classroom. He contended (18) that less emphasis in initial learning should be placed on speed and accuracy in the product, and more on improvement of the process and the establishment of principles transferable to new procedures.

Detailed applications of educational psychology to the processes of learning and instruction are to be found in the Forty-Ninth Yearbook of the National Society for the Study of Education (58). In this volume, a number of authors who themselves have long been conducting research in this field interpreted their findings and those of their colleagues. Following chapters on the nature of learning and of motivation, a second section describes the ways children learn motor types of activities, concepts and generalizations, interests and attitudes, personal and social adjustments, esthetic responses, and the technics of problem solving. Implications of learning principles are then pointed out for the different school levels and for teaching procedures.

English (31) presented a brief discussion of the nature of learning and a history of learning theory, while the most intensive and extensive treatment was given by Hilgard (45), who critically reviewed the current theories. Tolman (78) sought to explain the divergencies in theory by asserting that there is more than one kind of learning and listed six kinds including field expectancies, field cognition modes, drive discriminations and motor patterns. A detailed report of the psychological studies from which the theories are derived is to be found in the *Annual Review of Psychology* (70), the first issue of which appeared last year. In it there is a critical review of learning theory, with a 101-item bibliography by Melton, an analysis of problem-solving processes by Johnson, a report of growth and age changes especially in motor functions and mental abilities by Jones and Bayley, and a review of studies of assorted items from the field of educational psychology by Cronbach.

Piaget (62) continuing his long series of studies on the genetics of mental functions traced four stages in the development of what he called the moral judgment of the child by analyzing children's acceptance of the rules in the game of marbles. Gebhard (37) found that the attractiveness of an activity is determined not only by past experience of success but by the expectation of future success. Grace (39) concluded that verbal approval was more effective with the well-adjusted and emotionally stable. Postman (63), drawing from a 332-item bibliography, summarized the history and present status of the law of effect. In this connection, mention should be made of Thorndike's *Selected Writings from a Connectionist's Psychology* (76), in which studies published from 1913 to 1947 were chosen and arranged by the author himself including seven on learning.

Postman (65) is the senior author of one study in which it was found that forgetting in the form of retroactive inhibition is smaller when a change of set (e.g., direction of association or type of logical relationship) is used. In another study (64) he concluded that the subject's readiness for a particular type of test is a factor influencing set.

A 136-item bibliography accompanies an article (36) on the measurement of transfer of training which concluded that various methods of measurement suggest that different functions are being measured. Not only is it time that some of these functions are isolated, but the conditions under which what is learned in school will be used when needed require still further study.

School experimentation is bedeviled by the almost insuperable difficulty of the control of innumerable variables. Some, however, have faced up to the task. Anderson (2) found little difference in the result when pupils were taught arithmetic by a "drill method" (connectionist) and a "meaning method" (gestalt), altho the latter proved superior, for pupils scoring high on ability but low on initial achievement, in improving transfer to different kinds of materials.

A study of pupil interests (47) revealed that variations are determined largely by opportunities and incentives of the environment, which means that the learning factor is important; and since elementary pupils revealed more interest in school than high-school pupils, it was concluded that the schools can use their influence to create more satisfactory learning situations.

Studies of learning when learner differences are extreme have important implications for the wide range of abilities in the schools. Cruickshank (25) found that mentally retarded boys were less competent than normal boys of the same mental age in solving arithmetic problems. Strauss and Lehtinen (72) summarized 20 years of outstanding research on brain-injured children, reviewing especially-devised test situations, the characteristic behavior found, and applications to learning situations. Gesell (38) added a collection of papers reporting significant aspects of his work at the Yale Clinic previous to his retirement. And Terman and Oden (74) published the fourth volume of the *Genetic Studies of Genius—The Gifted Child Grows Up*, a 25-year follow-up of the original superior group, with educational and other implications, among which is the conclusion that in spite of the environmentalist's efforts, the hereditary hypothesis seems to stand up.

General Sources Based on Research Studies with Implications for the Curriculum and Teaching

Brickman (17) reviewed 16 texts and reference works in the field of educational psychology which were published during the years 1945-1948, and since then other texts have appeared including those by Beaumont and Macomber (8), Simpson (67), and Trow (79). Specific relationships of educational measurements and of a knowledge of individual differences to the curriculum were pointed out by Freeman (35) and Cook (24) respectively. Williams (86), after a survey of 223 titles, analyzed the approaches directed toward reducing and controlling intergroup tensions to which curriculum activities can make an important contribution.

Growth factors influencing the curriculum have received detailed standard treatment by a number of authors including Breckenridge and Vincent (16) and Hurlock (48, 49). Rasey (66) brought out a unique volume which develops the implications of the whole-child concept and includes reports from the autobiographies of 1600 students with critic-teacher comments. Olson (60) is the author of a significant report of research which has been continuing over a period of 20 years. The results of longitudinal studies are presented with important implications for elementary-school activities. Remedial reading, self-selection, and promotional policies, among other problems, receive attention. Beck in *Human Growth* (9) described the physiological changes accompanying adolescence as was done in the film by the same name. Havighurst (42) defined an interesting concept, the "developmental task," as one which, if successfully accomplished, leads to happiness and success with later tasks, but if not results in unhappiness, disapproval by society, and difficulty with later tasks.

At the elementary-school level, Averill (5) prepared a textbook for the whole period, and Forest (33) for students of early childhood education. Lee and Lee (52) emphasized the "integrative approach" in handling the elementary-school subjects, and Hildreth (44) developed the principles of organized and unified learning in harmony with behavioral development, interpreting them in terms of realistic life experiences.

At the high-school level two rather unique documents have appeared. One of them (73) presents in pamphlet form discussions of a hypothetical workshop group relating learning to diverse viewpoints and to curriculum experiences. The other (43), the "Prairie City" studies of the development of personality, is full of implications for programs of character education. Mention should also be made of a selected list of 72 references on gifted children (82), and of the Yearbook of the National Society for the Study of Education on *The Education of Exceptional Children* (59).

Curriculum and Co-curriculum—What Shall Students Learn?

While curriculum revisions are predominantly in the field of social learning, among the others that might be selected for special mention is Cureton's (26) work on physical fitness appraisal and guidance, which, along with other influences is likely to have the effect of improving the physical education program.

Luchins and Luchins (54) carried forward the structural approach to the comprehension of spatial relationships, supplementing Wertheimer's chapter on the area of a parallelogram which appeared in his *Productive Thinking*. Geometry teachers will find here suggestions for improving pupil comprehension. Meaning in arithmetic was studied by Van Engen (83) who favored what he called the concept of operational arithmetic, in which meanings are derived from acts or operations, in contrast with the social-meaning theory, the structural-meaning theory, and the nihilistic theory of numbers as meaningless symbols, which latter is perhaps far too prevalent.

A number of papers at the college level deal with the place of educational psychology in the training of teachers. Anderson (1, 4) defined the field of educational psychology, enumerating the contributions it can make to the education of teachers and indicated suggestions for content. Trow (80) carried the analysis further enunciating the objective as effective pupil participation, this to be attained in proportion to the extent to which the teacher can learn to structure the school environment, organize activities (curriculum), recognize proper objectives in terms of needs and values, and teach appropriate behavior (knowledge, skills, and attitudes). Details were elaborated by others: Blair analyzed the content of various texts (12) and pointed out what teachers should know about adolescence (13). Bruce indicated relationships with general psychology (21) and the importance of a knowledge of child development (20). Freeman (34) and Cook (23) emphasized the importance of a study of individual differences and of educational measurement (24) for the curriculum and for the education of teachers.

The direct approach has been made to the high-school pupil in order to facilitate his social learning thru the medium of the textbook. Thorpe (77) discussed understanding ourselves and others, maintaining personal and social integrity, character and religion, and personality and the welfare of society. Smart and Smart (68) were primarily concerned with the feelings and attitudes of children and their parents, and Duvall (30) prepared a text for family living which includes chapters on personality development, family interrelationships, boy-girl relationships, and preparation for marriage.

Weiner (84) reported on the prolonged preacademic curriculum of the Wayne County Training School and furnished a guide for the objective observation of preacademic achievements, a program designed for high-grade feeble-minded children, but which should be taken to heart by elementary teachers in regular schools. The important implications of play therapy for general educational activities were elaborated by Axline (6) and helpful hints for an elementary-school council were provided by O'Toole (62).

The lush growth of group dynamics at Bethel and elsewhere forces the question of its place in the regular school situation where the teacher perforce has the roles both of leader and of resource person, as well as others. After doing background reading on group dynamics (10) and the psychodrama technic (40) developed by Moreno, the reader may wish to consider some of the implications of considering the class as a group (75, 81).

From the social-work angle, group work has been going on for some time, and Strang (71) showed its relevance to schools and institutions of higher learning. Such efforts would seem appropriate since Bath (7) in a follow-up study found little to distinguish the winners from the non-winners of a junior high-school efficiency certificate in a good citizenship program of 20 years ago. Perhaps the most promising program for the future was initiated by the Horace Mann-Lincoln Institute of School experimentation. If effective improvements are to be made in the curriculum they will be made not so much as a consequence of what is done to teachers as of what they themselves do. This involves (46) research on the educational program thru cooperative teacher research and planning. More schoolwork than in the past will probably be carried on thru problem-centered group activities (32). This term designates an educational process by which teachers and students work cooperatively to solve problems related to the experiences, interests, and concerns of young people, in the process of which attitudes are structured and self-evaluation is encouraged.

Bibliography

1. Anderson, George Lester. "Educational Psychology and Teacher Education." *Journal of Educational Psychology* 40: 275-84; May 1949.
2. Anderson, George Lester. "Quantitative Thinking as Developed Under Connectionist and Field Theories of Learning." In Swenson, Esther; Anderson, G. Lester; and Stacey, Chalmers L. *Learning Theory in School Situations.* Minneapolis: University of Minnesota Press, 1949. 103 p.
3. Anderson, George Lester. "Theories of Behavior and Some Curriculum Issues." *Journal of Educational Psychology.* 39: 133-40; March 1948.
4. Anderson, George Lester. "What the Psychology of Learning Has To Contribute to the Education of the Teacher." *Journal of Educational Psychology* 41: 362-65; October 1950.
5. Averill, Lawrence A. *The Psychology of the Elementary School Child.* New York: Longmans, Green and Co., 1949. 459 p.
6. Axline, Virginia Mae. *Play Therapy: The Inner Dynamics of Childhood.* Boston: Houghton Mifflin Co., 1947. 379 p.

7. BATH, JOHN A. "A Study of Selected Participants and Non-Participants in a Program Directed Toward the Development of Initiative and Good Citizenship." *Journal of Experimental Education* 16: 161-75; March 1948.
8. BEAUMONT, HENRY, and MACOMBER, FREEMAN G. *Psychological Factors in Education*. New York: McGraw-Hill Book Co., 1949. 318 p.
9. BECK, LESTER F. *Human Growth*. New York: Harcourt, Brace and Co., 1949. 124 p.
10. BENNE, KENNETH D.; BRADFORD, LELAND P.; and LIPPITT, RONALD. *Group Dynamics and Social Action*. New York: Anti-Defamation League of B'nai B'rith, 1950. 62 p.
11. BLAIR, GLENN M. "How Learning Theory Is Related to Curriculum Organization." *Journal of Educational Psychology*. 39: 161-66, March 1948.
12. BLAIR, GLENN M. "The Content of Educational Psychology." *Journal of Educational Psychology* 40: 267-74; May 1949.
13. BLAIR, GLENN M. "What Teachers Should Know About the Psychology of Adolescence." *Journal of Educational Psychology* 41: 356-61; October 1950.
14. BODE, BOYD H., and OTHERS. *Modern Education and Human Values*. Pittsburgh: University of Pittsburgh Press, 1947. 165 p.
15. BODE, BOYD H. "John Dewey's Philosophy of Education." *New Republic* 121: 10-39, October 1949.
16. BRECKENRIDGE, MARIAN E., and VINCENT, ELIZABETH LEE. *Child Development*. Revised edition. Philadelphia: Saunders Co., 1943. 1949. 622 p.
17. BRICKMAN, WILLIAM W. "Educational Psychology: A Review." *School and Society* 68: 218-23; September 1948.
18. BROWNELL, WILLIAM A. "Criteria of Learning in Educational Research." *Journal of Educational Psychology* 39: 170-82; March 1948.
19. BROWNELL, WILLIAM A. "Learning Theory and Educational Practice." *Journal of Educational Research* 41: 481-97; March 1948.
20. BRUCE, WILLIAM F. "How Can the Psychology of Development in Infancy and Childhood Help Teachers?" *Journal of Educational Psychology* 41: 348-55; October 1950.
21. BRUCE, WILLIAM F. "The Relations of Educational Psychology with General Psychology." *Journal of Educational Psychology* 40: 261-66; May 1949.
22. CASWELL, HOLLIS L. "Influence of John Dewey on the Curriculum of American Schools." *Teachers College Record* 51: 144-46; December 1949.
23. COOK, WALTER W. "Individual Differences and Curriculum Practice." *Journal of Educational Psychology* 39: 141-418; March 1948.
24. COOK, WALTER W. "What Educational Measurement in the Education of Teachers?" *Journal of Educational Psychology* 41: 339-47; October 1950.
25. CRUICKSHANK, WILLIAM M. "Arithmetic Ability of Mentally Retarded Children." *Journal of Educational Research* 42: 161-70, 279-88; November-December 1948.
26. CURETON, THOMAS K. *Physical Fitness Appraisal and Guidance*. St. Louis: C. V. Mosby Co., 1947. 566 p.
27. DENNIS, WAYNE, editor. *Current Trends in Social Psychology*. Pittsburgh: University of Pittsburgh Press, 1948. 299 p.
28. DEWEY, JOHN. *Reconstruction in Philosophy*. Enlarged edition. Boston: Houghton Mifflin Co., 1948. 224 p.
29. DOLLARD, JOHN, and MILLER, NEAL E. *Personality and Psychotherapy*. New York: McGraw-Hill Book Co. 1950. 488 p.
30. DUVALL, EVELYN MILLIS. *Family Living*. New York: Macmillan Co., 1950. 410 p.
31. ENGLISH, HORACE B. *Learning as Psychotechnology*. Columbus: Ohio State University, 1949. 81 p.
32. EVANS, HUBERT M., editor. "The Problem-Centered Group and Personal-Social Problems of Young People." *Teachers College Record*. 51: 438-59; April 1950.
33. FOREST, ILSE. *Early Years at School*. New York: McGraw-Hill Book Co., 1949. 381 p.
34. FREEMAN, FRANK S. "The Study of Individual Differences in the Education of Teachers." *Journal of Educational Psychology* 41: 366-72; October 1950.
35. FREEMAN, FRANK S. "How the Curriculum Is Evaluated and Modified Through Educational Measurement." *Journal of Educational Psychology* 39: 167-69; March 1948.
36. GAGNE, ROBERT M.; FOSTER, HARRIET; and CROWLEY, MIRIAM E. "The Measurement of Transfer of Training." *Psychological Bulletin* 45: 97-130; March 1948.

37. Gebhard, Mildred E. "The Effect of Success and Failure upon the Attractiveness of Activities as a Function of Experience, Expectation, and Need." *Journal of Experimental Psychology* 38: 371-88; August 1948.
38. Gesell, Arnold. *Studies in Child Development.* New York: Harper and Brothers, 1948. 224 p.
39. Grace, Gloria Lauer. "The Relation of Personality Characteristics and Responses to Verbal Approval in a Learning Task." *Genetic Psychology Monographs* 37: 73-99; 1948.
40. Grambs, Jean E. "Dynamics of Psychodrama in the Teaching Situation." *Sociatry* 1: 383-99; March 1948.
41. Harsh, Charles M., and Schrickel, H. G. *Personality, Development and Assessment.* New York: The Ronald Press Co., 1950. 518 p.
42. Havighurst, Robert J. *Developmental Tasks and Education.* Chicago: University of Chicago Press, 1948. 86 p.
43. Havighurst, Robert J., and Taba, Hilda. *Adolescent Character and Personality.* New York: John Wiley and Sons, 1949. 315 p.
44. Hildreth, Gertrude. *Child Growth Through Education.* New York: The Ronald Press Co., 1948. 437 p.
45. Hilgard, Ernest R. *Theories of Learning.* New York: Appleton-Century-Crofts, 1948. 409 p.
46. Horace Mann-Lincoln Institute of School Experimentation. "The Social-Cultural Context of the School Program." *Teachers College Record* 49: 325-29; February 1948.
47. Horace Mann-Lincoln Institute of School Experimentation. "Child Development and the Curriculum." *Teachers College Record* 49: 314-24; February 1948.
48. Hurlock, Elizabeth B. *Adolescent Development.* New York: McGraw-Hill Book Co., 1949. 566 p.
49. Hurlock, Elizabeth B. *Child Development.* Second edition. New York: McGraw-Hill Book Co., 1950. 669 p.
50. John Dewey Society. *Intercultural Attitudes in the Making.* Ninth Yearbook. New York: Harper and Brothers, 1947. 246 p.
51. Kluckhohn, Clyde, and Murray, Henry A., editors. *Personality: In Nature, Society, and Culture.* New York: Alfred A. Knopf, 1948. 561 p.
52. Lee, Jonathan Murray, and Lee, Doris May. *The Child and His Curriculum.* Second edition. New York: Appleton-Century-Crofts, 1950. 710 p.
53. Lepley, Ray, editor. *Value: A Cooperative Inquiry.* New York: Columbia University Press, 1949. 487 p.
54. Luchins, Abraham S., and Luchins, Edith H. "A Structural Approach to the Teaching of the Concept of Area in Intuitive Geometry." *Journal of Educational Research* 40: 528-33; March 1947.
55. MacLean, Malcolm S. "Adolescent Needs and Building the Curriculum." *Trends in Student Personnel Work.* (Edited by E. G. Williamson.) Minneapolis: University of Minnesota Press, 1949. p. 27-39.
56. Miller, Neal E. "Theory and Experiment Relating Psychoanalytic Displacement to Stimulus-Response Generalization." *Journal of Abnormal and Social Psychology* 43: 155-78; April 1948.
57. Money, John. "Delusion, Belief, and Fact." *Psychiatry* 11: 33-38, February 1948.
58. National Society for the Study of Education. *Learning and Instruction.* Forty-Ninth Yearbook, Part I. Chicago: University of Chicago Press, 1950. 352 p.
59. National Society for the Study of Education. *The Education of Exceptional Children.* Forty-Ninth Yearbook. Part II. Chicago: University of Chicago Press, 1950. 350 p.
60. Olson, Willard C. *Child Development.* Boston: D. C. Heath and Co., 1949. 417 p.
61. O'Toole, John F., Jr. "A Study of the Elementary School Student Council." *Elementary School Journal* 50: 259-67; January, 1950.
62. Piaget, Jean. *The Moral Judgment of the Child.* Glencoe, Ill.: Free Press, 1948. 418 p.
63. Postman, Leo J. "The History and Present Status of the Law of Effect." *Psychological Bulletin* 44: 489-563; November 1947.
64. Postman, Leo J., and Jenkins, William O. "An Experimental Analysis of Set in Rote Learning." *Journal of Experimental Psychology* 38: 683-89; December 1948.
65. Postman, Leo J., and Postman, Dorothy L. "Change in Set as a Determinant of Retroactive Inhibition." *American Journal of Psychology* 61: 236-42; April 1948.

66. RASEY, MARIE I. *Toward Maturity*. New York: Hinds, Hayden, and Eldredge, 1947. 242 p.
67. SIMPSON, ROBERT G. *Fundamentals of Educational Psychology*. New York: J. B. Lippincott Co., 1949. 380 p.
68. SMART, MOLLIE S., and SMART, RUSSEL C. *Living and Learning with Children*. Boston: Houghton Mifflin Co., 1949. 271 p.
69. SNYGG, DONALD, and COMBS, ARTHUR W. *Individual Behavior, A New Frame of Reference*. New York: Harper and Brothers, 1948. 386 p.
70. STONE, CALVIN P., editor. *Annual Review of Psychology*. Stanford, Calif.: Annual Reviews, 1950. 330 p.
71. STRANG, RUTH. "Group Work in Schools and Institutions of Higher Learning." *A Decade of Group Work*. (Edited by Charles E. Hendry.) New York: Association Press, 1948. p. 95-104.
72. STRAUSS, ALFRED A., and LEHTINEN, LAURA E. *Psychopathology and Education of the Brain-Injured Child*. New York: Grune and Stratton, 1947. 220 p.
73. SUGARMAN, MYRTLE F., editor. *Effective Learning for Use in Junior High School*. Denver Public Schools, 1949. 72 p.
74. TERMAN, LEWIS M., and ODEN, MELITA H. *The Gifted Child Grows Up*. Stanford, Calif.: Stanford University Press, 1947. 448 p.
75. THELEN, HERBERT A. "Human Dynamics in the Classroom." *Journal of Social Issues* 6: 30-55; 1950.
76. THORNDIKE, EDWARD L. *Selected Writings from a Connectionist's Psychology*. New York: Appleton-Century-Crofts, 1949. 370 p.
77. THORPE, LOUIS P. *Personality and Youth*. Dubuque, Iowa: William C. Brown Co., 1949. 378 p.
78. TOLMAN, EDWARD C. "There Is More than One Kind of Learning." *Psychological Review* 56: 144-55; May 1949.
79. TROW, WILLIAM CLARK. *Educational Psychology*. Revised edition. Boston: Houghton Mifflin Co., 1950. 761 p.
80. TROW, WILLIAM CLARK. "Educational Psychology Charts a Course." *Journal of Educational Psychology* 40: 285-94; May 1949.
81. TROW, WILLIAM CLARK, and OTHERS. "Psychology of Group Behavior." *Journal of Educational Psychology* 41: 322-38; October 1950.
82. U. S. OFFICE OF EDUCATION. "Selected References on Gifted Children." *Understanding the Child* 17: 56-64; April 1948.
83. VAN ENGEN, HENRY. "An Analysis of Meaning in Arithmetic." *Elementary School Journal* 49: 321-29, 395-400; February-March 1949.
84. WEINER, BLUMA BERYL. "The Use of Systematic Classroom Observation To Aid in Curriculum Planning and Guidance for Young Mentally Retarded Boys." *American Journal of Mental Deficiency* 52: 331-36, April 1948.
85. WERNER, HEINZ. *Comparative Psychology of Mental Development*. Revised edition. Chicago: Follett Publishing Co., 1948. 564 p.
86. WILLIAMS, ROBIN M., JR. *The Reduction of Intergroup Tensions: A Survey of Research on Problems of Ethnic, Racial, and Religious Group Relations*. Social Science Research Council Bulletin No. 57, 1947. 153 p.
87. WOODRUFF, ASAHEL D. "Motivation Theory and Educational Practice." *Journal of Educational Psychology* 40: 33-40; January 1949.
88. WRIGHT, HERBERT F. "How the Psychology of Motivation Is Related to Curriculum Development." *Journal of Educational Psychology* 39: 149-56; March 1948.

CHAPTER III

Design and Pattern of the Curriculum

ARTHUR W. GILBERT

THE pattern of curriculum content actually being employed in teaching the nation's children is apparently being affected by several strong trends or pressures. Foremost among these, in its immediate results, is a public clamor for more emphasis on the 3 R's. Not based on any research data showing real loss in efficiency in teaching the 3 R's, this pressure has nevertheless had the effect of causing administrators to reevaluate their school programs and has given new pragmatic value to the objective measurement of achievement in these skills. A substantial byproduct of this whole movement is a renewed interest in the technical details of skilled teaching of the 3 R's, which rests on the mass of research done, for the most part, between 1920 and 1940.

Another trend, powered chiefly from within school circles, is to bring the systematic study of human relations definitely into the realm of learning experiences planned for children. The relatively intangible nature of the outcomes sought by this means, and the all-important influence of the teacher's attitude and interpersonal relationships, have given added impetus to the "action research" movement which has made its most substantial contribution in this area.

Elementary Curriculum Trends and Present General Status

Something of the status of curriculum design and content in 1949 can be inferred from the study of literature since 1890 made by Shores (72), altho only two of the 130 titles there referred to are as late as 1948. Two major movements—minimum essentials, and activity—are still under way, with research in the former centering upon improvement of instruction, diagnosis, and remedial methods in the separate subject areas; in the latter, focusing upon psycho-biological studies of child growth and development. Shores finds a third movement—social reconstruction—assuming greater proportions, tho it is not yet "a current dominant influence upon the elementary-school curriculum." Caswell (11) expresses the view that as a result of depression and war there has been an increasing emphasis upon the search for a curriculum "which would meet with effectiveness and directness the problems and conditions of our society," and he further draws together (12) descriptions of curriculum work in nine localities which, while focusing on the processes of changing the curriculum, do give some idea of the modifications in learning experiences which are being provided for pupils. In a questionnaire study of 50 cities over 100,000 in population, Toulouse (79) found evidence of a trend toward the organization of curriculum materials in terms of problems and needs of children, and of increased use of resource units by teachers. By staff visits to 84 selected elementary schools in the United States and Canada, the Educational Policies Commission (57) was able to report examples of current practice which illustrate the main points in its idealized school program.

Elementary School Subjects and Special Topics

The contribution of recent research to teaching of arithmetic is analyzed by Fehr (22) who is especially critical of the lack of conclusiveness it offers in respect to social utility, transfer of training, and use of sensory aids. Research seems to have been more effective in promoting proper attention to readiness and meaning in teaching arithmetic.

A science curriculum can be soundly built on a series of 25 basic principles which Fisher (24) found in study of the literature, including one to the effect that it should be constructed of materials drawn from the child's own environment, and another that it consider primarily problems of living and social needs. One phase of a broad science program—conservation—has received considerable emphasis during this period, particularly in a survey of current practices in schools all over the United States made by the ASCD (5). Analysis of these practices seems to indicate preoccupation with local specific resources and a lack of attention to some basic understandings—such as principles of balance in the natural environment and a working classification.

Landis (49) draws some conclusions about sex education in the school program from a questionnaire study of 307 pairs of college girls and their mothers. He finds that a much larger percent of girls in the present generation are receiving sex information from their parents at an earlier age, and premarital advice from special sources. Despite this improvement in the use of what his respondents considered the best source of information (parents), more than 50 percent of them indicated that the school should provide systematic instruction in this area.

Religious Education

Because of the great interest in the subject, especially after the Supreme Court decision in the McCollum case (1948), a survey of the status of religious education in the public schools was made by the Research Division of the NEA (56). Replies to a questionnaire by 2639 school systems showed that 26.8 percent had some kind of association with a program of religious education. These included schools in 43 states, and actively involved about 14 percent of the pupils enrolled in them. Comparisons are possible with previous studies made by the NEA.

Camping

Weil (81) reports on a carefully controlled situation involving fifth- and seventh-grade pupils from New York City who spent three and one-half weeks in camp. Each pupil was paired with a noncamper and objective evaluation of progress was made in such areas as health, arithmetic, nature study, vocabulary, language arts, and science. In eight of the 10 comparisons, the advantage was with the camping group, tho in only five was the difference statistically significant. Practical benefits of camping programs to school administrators are surveyed in detail in a whole issue of the *National Elementary Principal* (62). Both Harms (31) and Joy (43) analyze the trends in camping experiences since 1900 and find too many conventional city activities in present camp programs. They call for a judicious return to more primitive camp conditions and a careful study of the real purpose of this kind of experience.

General Trends in Secondary Curriculum

French (26) evaluates a five-year period in terms of growth toward the patterns suggested in "Education for All American Youth" and finds the most significant change in practice to be the modifications brought about by application of the principle that the school program should meet the 10 imperative needs of youth. Two other trends are (a) emphasis on common learnings for psychological reasons and (b) provision of more practical instruction for older youth. Herriott (33) shows how the "imperative needs" have been employed to modify a curriculum which retains its general subjectmatter organization. Rahn (63) suggests three other guides to curriculum change besides imperative needs; viz. developmental tasks of youth, social cruciality, and growth in values underlying democracy. Rogers (65) restates the 10 imperative needs in terms of junior high-school youth and applies them in some detail to a school program. Other trends which Rogers considers substantial, for the junior high at least, are emphasizing the development of moral and spiritual values, grouping for purposes of special instruction, and recognition of the need for more effective teaching of reading skills.

Newsom (60) looks over a period of change in secondary-school programs and notes significant alteration in the guidance activities now being employed, a decline in the relative importance of textbooks as instructional material, and greatly increased attention to general education.

Two studies, using more precise methods, give results which show how slowly the changes are actually taking place. Romine (66) got usable questionnaire replies from more than 400 secondary schools representing every one of the 48 states, and well scattered as to size and type of community. Of the 31 desirable practices listed on the questionnaire, only three were found to be generally receiving more emphasis. College entrance requirements are still a potent factor, and there is not yet much evidence of teacher-pupil planning or improved instruction in technics of reading.

Ivins, Fox, and Segel (39) carried out an intensive evaluation of the student body of an Indiana high school, using appropriate instruments to measure ability, achievement, attitudes, and social adjustment. On comparing the results with the school's stated philosophy and course offerings, they came to the conclusion that the curriculum was not suited to the pupils' abilities and did not make adequate provision for individual differences. Selection of a strong average school was made deliberately so that the findings should not be attributed to an individual school's unusual shortcomings.

Health Education

In the field of health education, Kilander (46) notes a trend toward more emphasis on teaching an understanding of the scientific background of good health—an approach which is becoming more important as statistics show a decline in deaths due to communicable diseases (which the community can deal with by policing methods), and an increase in mortality rates from diseases which only the individual, thru assuming personal responsibility, can control.

Driver Education

Driver education has expanded rapidly, and the literature is replete with descriptions of various plans that can be employed. There is however, little carefully-documented evidence as to a resulting decrease in accidental death or property loss, or as to the relative merit of different instructional plans. A study (6) of 2200 teen-age drivers in Delaware, half of whom had had training in driver education classes, showed that the trained group had about 60 percent fewer arrests, accidents and warnings than the untrained. Keiffer (45) reports that Cincinnati practice—in both driver education and driver training—was improved by having pupil representatives from the eight high schools analyze the course and indicate how it could better meet their actual needs.

Statewide Programs of Curriculum Development

Programs of curriculum development, being carried on in many states under the sponsorship or with the cooperation of the State Department of Education, are in varying stages of completeness. The literature is mostly descriptive of plans. Toulouse (78) reports a questionnaire study of the policies and practices in the various states, noting the great increase in activity since 1940, and the tendency of State Departments to add specialized curriculum personnel to aid in the work. A common policy of playing down "prescription" and of encouraging local activity to meet community needs is also reported in this study. A brief report on the framework of a California study and the way it is to be used is made by Fields (23), and the Maryland plan which emphasized general education is described by Saylor (70).

The most extensive program to be reported during this period is in progress in Illinois where a number of state, local, private, and professional agencies are cooperating in a plan described by Sanford (69). The program provides for two types of projects; (a) four basic studies of problems common to all schools, and (b) studies of problems identified by particular schools. Operations have reached 135 high schools and over 3000 administrators and teachers, and a series of written reports have been widely circulated. A general guide to study of the curriculum has been prepared by Houston, Sanford, and Trump (37), and there is one especially for the junior high school (52). These are special guides for making the four basic studies—on holding power by Allen (2), on hidden tuition costs by Hand (29), on participation in extra-class activities by Hand (30), and on guidance services by Lovelass (51). Recognition of the importance of human relations in curriculum revision is indicated in a separate bulletin in the series by Benne and Muntyan (8). Principal findings in the basic studies are reviewed by Hand (28).

Core Curriculum

From a questionnaire survey made in 1949 Wright (85) concludes that "the core curriculum is not commonly found in America's public high schools." Larger schools, enrolment over 500, reported core plans in 11.3 percent of the cases: smaller schools in only 2 percent. Average of all is 3.5 percent and seven states account for 62 percent of the plans in operation. The core plan is still primarily a junior high-school practice, 86 percent of all programs being in Grades VII, VIII and IX. In the schools having core plans, 72 percent report them in one or two grades only. Core organizations range from subject combinations (English-Social Studies, most commonly) to experience-centered plans.

The philosophy and psychology of core programs of all kinds are treated in many writings of the period, and arguments for and against appear frequently, as do brief or extended descriptions of the specific plans in actual use. But in few cases is there a combination of description and evaluation which would qualify the report as a research study. A report of the Clear Lake Conference (55) summarizes the place of evaluation in planning and carrying out core programs, but does not apply the evaluation to any project under way. Hock (36) describes a program that has been going for several years, but only suggests the evaluation that is to be made.

More thoro evaluation is apparent in four studies of specific core classes. Heisler (32) found that with a seventh grade core class a series of 8 lessons in group dynamics, using discussion manuals, sociograms, and sociodrama, definite progress could be made in acquiring the skills needed. Whittaker (83) used the sequence of high-school units in the Consumer

Education Series with a senior core class meeting on a double-period schedule. Evidence that the desired outcomes were reached was gathered mainly from observation of pupil behavior which showed a high degree of activity and initiative, and unusual progress in arriving at personal decisions regarding social and vocational plans. Mudd (54) gives in detail the story of a three-year experiment with a core program in Grades VII, VIII and IX, including a plan of evaluation using informal means and formal tests. Only the results of informal evaluation are reported, and on the basis of teacher reaction, observation of pupil behavior, and the extensive use of other instructional materials than textbooks it is concluded that the experiment has been successful. It is suggested that the real test is yet to come—How well will the students do later in high school? Evans and Corey (20) applied the pupil-reaction technic of evaluation to a basic living core at the tenth-grade level with mixed results. The pupil responses seemed to indicate less doubt about the methods of core operation than about the content dealt with and the amount of time required for it.

One significant factor in the success or failure of core programs—and probably one reason why they are not oftener put into operation—is the practical difficulty of arranging suitable instructional materials. Alberty (1) finds that the development and use of *resource units* is one promising way of giving teachers the necessary feeling of security to break away from the recitation method with its great reliance upon a single textbook. Reid (64) reports a study of the problems teachers face in selecting instructional materials for core programs which are frequently problem-centered, whereas most of the available materials are subjectmatter centered.

Work Experience

The extent of work-experience programs in secondary-school curriculums was investigated by the Research Division of the National Education Association and reported along with descriptions of plans in operation, in the Twenty-Sixth Yearbook of the AASA (3). Work experience is part of the program in 54 percent of the 500 schools furnishing information, is concentrated in Grades XI and XII, seems to have grown somewhat since the end of World War II, and, where once established, takes a firm hold. Schmaelzle (71), evaluating the program in San Francisco schools, and noting the wide range of activities still available to pupils, suggests that work experience is very useful as a guidance tool. Ivins and Wey (40) describe two projects of the "informal" work-experience type—work not done for pay by an outside employer—and report that when carefully planned in correlation with regular classwork, the outcomes include substantial production and improved attitudes. Dillon (16), after studying the records of over 3000 pupils in the fairly typical work-experience situation, concludes that it increases the holding power of the school (by 16 percent of those in the work programs), that it has no appreciable effect on scholarship, that it is good for the morale of the pupils (furnishing many of them a first success experience), and that it enables the school to exercise a wholesome influence on working conditions. Bateman (7) set up a situation in which he could test the claim that work experience improves attitudes toward school and school subjects. From school records and the replies on checklists and attitude scales of 263 pairs of boys and girls in Grades XI and XII—one in each pair doing paid work and the other not—he concludes that there are no significant differences attributable to the work experience.

Curriculum in Higher Education

Gerard (27) reports progress in the long-range evaluation plan of the college at the University of Chicago. By equating students who enter the college early and finish its work at Grade XIV with others who do their college work elsewhere, it is expected that conclusive evidence regarding the accelerated program will be forthcoming. Data are being accumulated from psychological and achievement tests, interviews, and schedules of various kinds. In the fourth year of the evaluation program 100 graduating students of the college reached a median percentile of 92 on the Graduate Record Examinations, a favorable comparison with records made by many college students of two years greater maturity.

General education is the common theme at the college as well as at the high-school level, as institutions attempt to work out the best possible curriculum. Fewer electives and some provision for broader foundation work are indicated by Wriston (86) as characteristic of the new curriculum at Brown University—where a foreign language, competence in English, and a higher standard of work are also factors; and by Hewlitt (34) for Amherst—where laboratory sessions or seminars are being emphasized. Trowbridge (80) analyzes the four patterns of general education at the college level; and Johnson (41) describes some developments of the Community College.

In relation to public junior colleges, Hillmer (35) found a great increase in the number of students enrolled in terminal courses in 1948, as compared with the figures for 1941 and 1931. The number had doubled in a decade, and had been multiplied twenty times since 1931. In percent also, the number of students in these terminal courses has also increased—from 20 percent in 1931, to 47 percent in 1948. But Hillmer's figures show that more than half of these terminal students are in the general culture course, which leads him to think that perhaps the junior colleges are failing somewhat to perform their proper function, and are using this general course as a means of salvaging students who would not graduate otherwise.

Life Adjustment Education

The phrase "life adjustment education" is being used to refer to a movement which is expected "to be the means for really putting fire under such plans as 'general education' and 'education for all American Youth.'" Hull (38) and Jones (42) have given this interpretation in their insistence that the basic consideration is not any particular pattern of school practice or organization but the imperative needs of youth. Douglass (18) points out that life adjustment education is really no more than effective schooling in all the areas of the "seven cardinal objectives" adjusted to fit the needs of *all* children. He also demonstrates, by a thoro treatment of the opportunities for meeting needs of youth by modifications in the usual subjects of the high-school program, that application of the principles of "life adjustment education" need not imply any radical change in design of the school curriculum.

Education for Citizenship

Under the serious pressures of the times much work has been done in the teaching of citizenship, most of which brings us to the general conclusion that the active practice of democracy in education is the best teacher of good citizenship. But Dale (15) found that improvement of citizenship education was considered a major problem by over two-thirds of Ohio superintendents, altho many of the supposedly good practices in citizenship were being employed by the schools. Peters (61) describes a plan, called "democratic, action-centered education," which he developed over a two-year period in 15 schools. The Detroit citizenship study is outlined by Dimond (17) and one of its resultant instruments for evaluating school practices in relation to child growth and citizenship has been published by Weston (82). The first year of the Kansas Study of Education for Citizenship, involving projects in 25 high schools showed (44) that pupils were not making satisfactory gains, probably because the objectives had not been sufficiently defined in terms of pupil behavior. First steps in the development of an even more ambitious experiment in teaching citizenship, made possible by Carnegie funds, are detailed by Russell (67).

Significant studies of "current events" in relation to teaching responsible citizenship are reported by Corbet (14) from 192 colleges, schools, or school systems personally visited by a three-man staff to find outstanding practices; and by Kinney and Dresden (47) who have been carrying on a cooperative project in improving instruction in some California schools thru the use of current materials.

That an instructional period as short as seven weeks can produce measurable changes in pupil's attitudes toward world peace is maintained by Klee (48) as the result of some experimentation with eleventh-grade students. Further evidence that social learnings can be evaluated is given by Foshay (25) who points to the need for adequate description of the behavior to be affected and its relation to the total behavior of the pupil.

Education of Exceptional Children

Under the increasing impact of two basic ideas (education for *all* children, and provision for individual differences) and with more state financial aid, the special education program has been greatly expanded. Russell and Hill (68) report from a survey of 271 California schools that 43 percent of them have some special classes for immature children aged five and six, and that 50 percent follow a plan of having these children take three years in a primary division instead of two. Changes in curriculum are considered more important even than the time factor. Levison (50) describes the adjustments for the 20 percent of slow-learning children in New York City schools thru (a) a general diploma curriculum, and (b) the CRMD (Children with Retarded Mental Development) classes for those with IQ's between 50 and 80. Evidences of the effectiveness of these plans are found in a larger number of graduates with no retardation, in a reduction of the dropouts, in better adjustment to school, and in better performance on the job after graduation. Martens (53) brings together many illustrations of school practices with the mentally retarded in the revision of an earlier bulletin which, significantly, differs from its predecessor mainly in the inclusion of a chapter on the high school. Practices in the education of the gifted are summarized in a bulletin of the Educational Policies Commission (58). Research in all the various areas of education for exceptional children is brought together in an extensive volume by Baker (59).

Atomic Energy

There is evidence that the greatest effect of the widespread concern for understanding in the matter of atomic energy will not be extensive revision of science courses or introduction of separate atomic energy units, but rather a tremendous increase in emphasis on developing better human relations, more effective group processes, and knowledge of international affairs. This trend is anticipated by Evans (19) who analyzes the school's job as (a) reducing ignorance regarding human relations and atomic energy, (b) developing the technics of group process as a means of reducing ignorance, (c) the deliberate development of democratic attitudes and values, (d) revealing the nature of the work world in an atomic age. Williams (84) describes an atomic energy education project in a large high school, from the first preplanning, thru school assemblies, exhibits, discussions and forums, to a final evaluation of the project by both teachers and pupils which showed, in general, that the intended objectives had been reached. Starr and Leavitt (73) indicate another approach to a school project on atomic energy—thru outlines for special use in other subjects.

Teaching Human Relations

Problems of human relations assume a prominent place in the literature of the period, as already indicated. They cover a wide range and involve varied technics. Keeping elementary-school practices consistent with principles of mental hygiene is the theme of an ASCD yearbook staff (4). Bullis and O'Malley (10) provide a second set of lessons by which upper-grade children can come to a better understanding of themselves. Berger (9) shows that high-school students can discover and apply ways of resolving conflicts constructively, under proper conditions. Stiles (74) used discussion technics successfully with 172 middle-grade pupils to produce desired changes in social behavior. In the field of intergroup relations, Taba reports experimental projects on the elementary level (77), in an eighth grade (76), and in secondary schools (75); while Cook brings together the story of cooperative projects in 24 colleges. The Philadelphia Openmindedness Study interpreted by Everett (21) challenges teachers other than those in the original experiment to use the proved methods of reducing prejudice.

Bibliography

1. Alberty, Harold B. "The Construction and Use of Resource Units in the Social Studies Area." *Redirecting Education*. Philadelphia: School of Education, University of Pennsylvania, 1948. p. 201-209.
2. Allen, Charles M. *How To Conduct the Holding Power Study*. Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 3. Springfield, Ill.: Office of the State Superintendent of Public Instruction, 1949. 128 p.
3. American Association of School Administrators. *The Expanding Role of Education*. Twenty-Sixth Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1948. 484 p.
4. Association for Supervision and Curriculum Development. *Fostering Mental Health in Our Schools*. 1950 Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1950. 320 p.
5. Association for Supervision and Curriculum Development. *Large Was Our Bounty*. 1948 Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1948. 216 p.
6. Association of Casualty and Surety Companies. "Instruction in Safety." *School Review* 53: 377; October 1950.
7. Bateman, Richard M. "The Effect of Work Experience on the Attitude of High School Students Toward School and School Subjects." *Educational Administration and Supervision* 35: 157-64; March 1949.
8. Benne, Kenneth, and Muntyan Bozidar. *Human Relations in Curriculum Change*. Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 7. Springfield, Ill.: Office of the State Superintendent of Public Instruction, 1949. 316 p.
9. Berger, Donald W. "Handling Human Relations in Cooperative Learning." *Progressive Education* 26: 180-83; April 1949.
10. Bullis, Harold Edmund, and O'Malley, Emily E. *Human Relations in the Classroom, Course II*. Wilmington, Del.: Mental Hygiene Society, 1948. 222 p.
11. Caswell, Hollis L. "Unfinished Business in Curriculum Development." *Teachers College Record* 50: 360-69; February 1949.
12. Caswell, Hollis, and others. *Curriculum Improvement in Public School Systems*. New York: Teachers College, Columbia University, 1950. 462 p.
13. Cook, Lloyd A., editor. *College Programs in Intergroup Relations*. College Study in Intergroup Relations, Vol. I. Council on Cooperation in Teacher Education. Washington, D. C.: American Council on Education, 1950. 366 p.
14. Corbett, James F., and others. *Current Affairs and Modern Education*. New York: New York Times Co., 1950. 278 p.
15. Dale, Edgar. "Survey of Curriculum Problems and Practices in Ohio Schools." *Educational Research Bulletin* 28: 85-92; April 1949.

16. Dillon, Harold J. "Work Experience Program." *National Association of Secondary-School Principals Bulletin* 32: 250-55; March 1948.

17. Dimond, Stanley E. "The Detroit Citizenship Education Study." *Improving Educational Research.* Official Report of 1948 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1948. p. 153-55.

18. Douglass, Harl R., editor. *Education for Life Adjustment.* New York: The Ronald Press Co., 1950. 491 p.

19. Evans, Hubert M. "Challenge of the Atomic Age." *Teachers College Record* 49: 406; March 1948.

20. Evans, Hubert M., and Corey, Stephen M. "Cooperative Research and Curriculum Improvement." *Teachers College Record* 51: 407-74; April 1950.

21. Everett, Samuel. "Teachers Combat Prejudice." *NEA Journal* 37: 216-17; April 1948.

22. Fehr, Howard F. "Present Research in Teaching Arithmetic." *Teachers College Record* 52: 11-23; October 1950.

23. Fields, Ralph R. "California Framework Committee: Progress Report." *California Journal of Secondary Education* 23: 392-97; November 1948.

24. Fisher, Lewis R. "Guiding Principles in Curriculum Making for Science in Elementary Schools." *School Science and Mathematics* 49: 631-38; November 1949.

25. Foshay, Arthur W. "Evaluating Social Learnings." *Childhood Education* 26: 65-69; October 1949.

26. French, Will. "Education for All American Youth—Five Years After." *NEA Journal* 38: 516-17; October 1949.

27. Gerard, Ralph W. "A Study of Educational Progress." *Journal of Higher Education* 19: 21-32; January 1948.

28. Hand, Harold C. *Principal Findings of the 1947-48 Basic Studies of the Illinois Secondary School Curriculum Program.* Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 2. Springfield, Ill.: Office of the State Superintendent of Public Instruction, 1949. 77 p.

29. Hand, Harold C. *How To Conduct the Hidden Tuition-Cost Study.* Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 4. Springfield, Ill.: Office of the State Superintendent of Public Instruction, 1949. 51 p.

30. Hand, Harold C. *How To Conduct the Participation in Extra-Class Activities Study.* Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 5. Springfield, Ill. Office of the State Superintendent of Public Instruction, 1949. 66 p.

31. Harms, Ernest. "The Changing Pattern of the American Children's Camp." *School and Society* 71: 97-99; February 18, 1950.

32. Heisler, Walter, and others. "Group Dynamics: A Junior-High School Class Experiment." *Clearing House* 24: 151-54; November 1949.

33. Herriott, Marion E. "What Is a Functional Program for the Junior High School?" *National Association of Secondary-School Principals Bulletin* 33: 95-108; May 1949.

34. Hewlitt, Horace W. "Amherst's New Curriculum in Its First Year." *Journal of Higher Education* 19: 365-68; October 1948.

35. Hillmer, M. A. "Terminal Curriculum Offered in Public Junior Colleges in the United States." *Junior College Journal* 20: 128-30; November 1949.

36. Hock, Louise E. "Curriculum Development, Experimental Study at School 42." *Baltimore Bulletin of Education* 26: 11-14; June 1949.

37. Houston, Victor M.; Sanford, Charles W.; and Trump, J. Lloyd. *Guide to the Study of the Curriculum in the Secondary Schools of Illinois.* Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 1. Springfield, Ill.: Office of the State Superintendent of Public Instruction, 1948. 44 p.

38. Hull, J. Dan. *A Primer of Life Adjustment Education for Youth.* Chicago: American Technological Society, 1949. 30 p.

39. Ivins, Wilson H.; Fox, William H.; and Segel, David. "Study of Secondary School Program in Light of the Characteristics and Needs of Youth." Vol. 25, No. 6. *Indiana University School of Education Bulletin.* Bloomington: School of Education, Indiana University, 1949. 69 p.

40. IVINS, WILSON H., and WEY, HERBERT W. "Capitalizing on Educational Values of Informal Work Experience." *School Review* 57: 485-89; November 1949.
41. JOHNSON, B. LAMAR. "College Programs of Less than Four Years—The Community College." *Current Trends in Higher Education, 1948.* Washington, D. C.: Department of Higher Education, National Education Association, 1948. p. 107.
42. JONES, GALEN. "Life Adjustment for Every Youth." *Educational Outlook* 24: 58-65; January 1950.
43. JOY, BARBARA E. "Getting More Real Camping into Camps." *Journal of Health and Physical Education* 19: 18-20; January 1948.
44. KANSAS STUDY OF EDUCATION FOR CITIZENSHIP. *An Evaluation of Citizenship Education in the High School.* Manhattan: Kansas State College Press, 1950.
45. KEIFFER, MILDRED. "Pupils Evaluate Driver Education." *Safety Education* 30: 13-14; October 1950.
46. KILANDER, HOLGER F. "Trends in Health Education in Secondary Schools." *School Life* 31: 6-7; April 1949.
47. KINNEY, LUCIEN, and DRESDEN, KATHARINE. *Better Learning Through Current Materials.* Stanford University: Stanford University Press, 1949. 182 p.
48. KLEE, LORETTA. "How Do You Feel About World Peace?" *Journal of Educational Research* 43: 187-96; November 1949.
49. LANDIS, PAUL H. "Sex Education: The Facts About Two Generations." *Clearing House* 24: 451-55; April 1950.
50. LEVISON, H. H. "What Program for the Slow Learner?" *National Association of Secondary-School Principals Bulletin* 33: 58; May 1949.
51. LOVELASS, HARRY D. *How To Conduct the Guidance Services of the School.* Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 6. Springfield, Ill.: Office of the State Superintendent of Public Instruction, 1949. 263 p.
52. LOW, CAMILLA M. *Guide to Curriculum Building—Junior High School Level.* Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 8. Springfield, Ill.: Office of the State Superintendent of Public Instruction, 1950. 181 p.
53. MARTEN, ELISE H. *Curriculum Adjustments for the Mentally Retarded.* United States Office of Education Bulletin 1950, No. 2. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 100 p.
54. MUDD, DOROTHY. "Core Program Uses Evaluation." *Educational Leadership* 8: 82-86; November 1950.
55. NATIONAL ASSOCIATION OF SECONDARY-SCHOOL PRINCIPALS. "Evaluating the Core Curriculum." *National Association of Secondary-School Principals Bulletin* 32: 52-61; November 1948.
56. NATIONAL EDUCATION ASSOCIATION, RESEARCH DIVISION. *Status of Religious Education in the Public Schools.* Washington, D. C.: the Association, 1949.
57. NATIONAL EDUCATION ASSOCIATION AND AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS, EDUCATIONAL POLICIES COMMISSION. *Education for All American Children.* Washington, D. C.: the Commission, 1948. 292 p.
58. NATIONAL EDUCATION ASSOCIATION AND AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS, EDUCATIONAL POLICIES COMMISSION. *Education of the Gifted.* Washington, D. C.: the Commission, 1950. 88 p.
59. NATIONAL SOCIETY FOR THE STUDY OF EDUCATION. *Education of Exceptional Children.* Forty-Ninth Yearbook, Part II. Chicago: University of Chicago Press, 1950. 350 p.
60. NEWSOM, NATHAN W. "Recent Trends in Curriculum Building in Secondary Schools." *National Association of Secondary-School Principals Bulletin* 32: 116-23; November 1948.
61. PETERS, CHARLES C. *Teaching High School History and Social Studies for Citizenship Training.* Coral Gables, Fla.: University of Miami Bookstore, 1948. 192 p.
62. PINKSTON, EVA G., editor. "Camping Education for the Elementary School Child." *National Elementary Principal* 28: 1-48; February 1949.
63. RAHN, GRANT. "Great Need: Youth Education for Effective Living." *National Association of Secondary-School Principals Bulletin* 32: 39-46; November 1948.
64. REID, CHANDOS. "Instructional Materials and Problem-Centered Teaching." *Teachers College Record* 52: 24-33; October 1950.

65. Rogers, Helen J. "Emerging Curriculum of the Modern Junior High School." *National Association of Secondary-School Principals Bulletin* 34: 128-38; April 1950.
66. Romine, Stephen A. "Some Trends in Secondary School Practices." *School Review* 56: 213-18; April 1948.
67. Russell, William F. "The Citizenship Education Project." *Teachers College Record* 52: 77-89; November 1950.
68. Russell, David H., and Hill, Ruby L. "Provision for Immature 5-6 Year Olds in California Schools." *California Journal of Elementary Education* 16: 210; May 1948.
69. Sanford, Charles W. "Challenging Developments in the Illinois Secondary School Curriculum Program." *National Association of Secondary-School Principals Bulletin* 33: 57-65; April 1949.
70. Saylor, Galen. "Maryland Emphasizes Programs in General Education." *Educational Leadership* 5: 282-83; January 1948.
71. Schmaelzle, Otto I. "How a Work Experience Program Operates." *California Journal of Secondary Education* 24: 168-71; March 1949.
72. Shores, J. Harlan. *Critical Review of the Research on Elementary School Curriculum Organization, 1898-1949.* Urbana: Bureau of Research and Service, College of Education, University of Illinois, 1949. 29 p.
73. Starr, Benjamin, and Leavitt, Abraham. "Social Studies and Operation Atomic Vision." *High Points* 31: 22-32; April 1949.
74. Stiles, Frances. "Developing an Understanding of Human Behavior at the Elementary School Level." *Journal of Educational Research* 43: 516-24; March 1950.
75. Taba, Hilda. "Curriculum in Intergroup Relations." *National Association of Secondary-School Principals Bulletin* 33: 1-168; February 1949.
76. Taba, Hilda, and Elkins, Deborah. *With Focus on Human Relations.* Washington, D. C.: American Council on Education, 1950. 227 p.
77. Taba, Hilda, and others. *Elementary Curriculum in Intergroup Relations.* Washington, D. C.: American Council on Education, 1950. 248 p.
78. Toulouse, Robert B. "States Look at Their Secondary Schools." *Educational Leadership* 6: 432-35; April 1949.
79. Toulouse, Robert B. "Curriculum Development Survey." *School Executive* 68: 32-33; August 1949.
80. Trowbridge, Hoyt. "General Education in the Liberal Arts College." *Current Trends in Higher Education 1948.* Washington, D. C.: Department of Higher Education, National Education Association, 1948. p. 85.
81. Weil, Truda T. "Camping Has a Place in the Regular Curriculum." *Nations Schools* 44: 27-29; July 1949.
82. Weston, Grace, and others. *Democratic Citizenship and Development of Children.* Detroit: Citizenship Education Study (436 Merrick Avenue) 1949. 43 p.
83. Whittaker, Charlotte C. "The Core Approach to Consumer Education." *National Association of Secondary-School Principals Bulletin* 32: 82-89; November 1948.
84. Williams, Anna C. "We Exposed Our Children to Atomic Energy." *School Review* 57: 295-99; May 1949.
85. Wright, Grace S. *Core Curriculum in Public High Schools.* United States Office of Education Bulletin 1950, No. 5. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 32 p.
86. Wriston, Henry M. "The Brown University Curriculum." *Journal of Higher Education* 19: 109-15; March 1948.

CHAPTER IV

Teaching Materials

WILLIAM G. BRINK and JOHN X. JAMRICH

THIS chapter will focus attention upon the review of teaching materials in contrast to learning materials. The former includes all materials of a research character which may be of professional use to teachers in guiding and directing the learning of children and youth. The review of research relating to learning materials which will be presented in the following chapter will include content designed primarily to facilitate pupil learning.

Certain trends are clearly discernible as regards research and publications in the area of teaching materials. Of these the following appear to be the most significant: (a) There has been a vast increase in the amount of professional literature in the form of courses of study, units of work, visual and audio-visual aids, and manuals and guides for curriculum development. (b) There has been a gradual shift in the preparation of teaching materials from a preoccupation with textbook learning toward an increasing emphasis upon identifying the life-needs of children and youth and the selection, organization, and grade placement, of learning experiences and activities to meet these needs. (c) In the preparation of courses of study and instructional guides, greater stress is being placed upon the comprehensive treatment of a rather small number of problems, units, or centers of interest rather than upon the encyclopedic treatment of many topics. (d) There has been a growing tendency toward the critical appraisal of teaching materials from the standpoint of their effectiveness in assisting teachers in the improvement of instruction. (e) There has been a growing awareness of the fact that if teaching materials are to serve their greatest value, teacher participation in their preparation is essential. (f) An increasing number of schools and school systems are developing curriculum centers or laboratories to facilitate the preparation of useful teaching materials.

Courses of Study, Units, Manuals

A considerable number of courses of study, resource units, and source materials were published during the period covered by this review. References to illustrations of such materials are cited in the bibliography (11, 17, 31, 32, 37, 62, 83). Of special interest is the rapid growth in the number of resource and teaching units on atomic energy (21, 81).

Discussions regarding the construction and use of resource units have been both general and specific. Typical of the former is the Wisconsin Curriculum Guide (91) which gives a very thoro and practical discussion of the construction of a resource unit and its application in a "problems approach" to curriculum construction. Tho primarily designed for the junior high-school level, the same principles could be applied at other levels of the school system.

McCusky and Paukner (50) gave a brief description of several bulletins, with guides to their use in curriculum building. Wagner (84) presented an annotated bibliography of curriculum publications emphasizing the general aspects of initiating, implementing, and evaluating curriculum programs. A specific guide of this type is the Illinois Guide to the Study of the Curriculum in the Secondary Schools (44).

A publication of the Denver Public Schools (26) is designed to assist the teacher in planning and developing an instructional unit. This pamphlet presents an outline indicating the essential elements of a unit and illustrates, by concrete example, how the outline is to be utilized. A similar consideration of unit construction primarily for the elementary level is presented by Strickland (76). This pamphlet was prepared to serve as an aid in selecting, preparing, and implementing units of work commensurate with the needs of pupils. Emphasis was placed on the preliminary step of taking an inventory of pupil interest and available resources, keeping in mind that a unit of work is unique with any given group of pupils. Four approaches to choosing a unit of work were listed, namely: (a) by the teacher and pupils out of the interests and contemporary activities of the group; (b) by the teacher and pupils to satisfy both the curriculum requirements of the school, and the needs and interests of the children; (c) by the teacher, from sources listing units of work; and (d) by the teacher, incorporating required textbook materials, but at the same time attempting to meet needs and interests of the children.

Henry (39) has discussed the growth of a unit in English, and McFadden (51) has indicated recent trends in the teaching of biology, with suggestions for the development of a course of study.

Sources of Teaching Materials

Sources of teaching materials have been listed by Williams (89). The educational services of various corporations also provide numerous teaching aids (8, 87). Free or inexpensive teaching materials are readily available. Various lists of these have been prepared by Anderson (5), Hansen (36), Miller (52), Heimers (38), Urbancek (82), Wood (92), and Fowlkes (33).

Evaluation of Printed Materials

Efforts to evaluate teaching materials have been based largely upon empirical evidence. Hillis (41) has stated criteria for good instructional materials. Corey (18) enumerated five primary considerations to be kept in mind in using instructional and teaching materials. These are: (a) teaching is more effective when a variety of materials is used, (b) the teacher must attempt to keep informed concerning newer teaching materials, (c) the teacher must provide herself with these available materials, (d) public expenditure must be made available for needed materials, and (e) utilization, by the teacher, must be continuously improved.

Criteria for the selection and evaluation of instructional material have been suggested by Potter (65). In her judgment the main elements to be considered are maturity levels of pupils, needs and interest of pupils, diversity of materials, authenticity, availability, and comprehensiveness. In the same article, Potter has given specific illustrations of materials in social studies, arithmetic, and physical education at the elementary-school level.

A survey and appraisal of teaching materials in the area of intergroup relations was published by the American Council on Education (2). Action research in the evaluation of teaching materials was described by Corey (19). Dresden (28) described an experiment in the use of current materials in the classroom.

Teaching Methods, Procedures, and Devices

The Forty-Ninth Yearbook of the National Society for the Study of Education gives an exhaustive presentation of two aspects of teaching method as it concerns the teacher. Part I (60) of this yearbook is devoted to a presentation of basic theory as to how children acquire concepts, generalizations, technics of problem solving, motor-type activities, interests, and motives. The second section of Part I is devoted to a discussion of the application and implementation of the principles at the various grade levels.

Part II of the Forty-Ninth Yearbook (61) is devoted to the education of exceptional children. Section I considers some general aspects of the problem in terms of diagnosis, guidance, types of teachers needed for exceptional children, and the characteristic growth patterns of children. In Section II, attention is given to the nature and needs of specific groups, such as the visually handicapped, speech and acoustically handicapped, mentally handicapped, socially maladjusted, and the gifted.

The 1949 Yearbook of the Association for Supervision and Curriculum Development (7) concerned itself with seven aspects of better teaching. These are: fostering security, promoting cooperative planning, helping pupils develop self-direction, fostering creativity, helping pupils develop values, providing opportunities for social action, and helping pupils evaluate learning. Each element was considered in detail, with illustrations of how the concept could be implemented in a classroom situation.

Specific research in certain subject areas and at various age levels included a study of picture writing by Oftedal (64), in which an attempt was made to describe and evaluate picture writing for the teacher, and also to indicate some of its uses, as, for example, in testing reading comprehension.

In evaluating clay modeling, Bullard (15) has shown the value of kinesthetic and sensory-motor experiences in learning new words at the first-grade level. Barrett (9) conducted an investigation designed to aid the classroom teacher in making effective use of art tests in determining the range of classroom ability and in discovering gifted children.

Vocabulary growth and reading comprehension, as they are affected by comic books, were studied by Sperzel (74). Three groups of 15 pupils each were matched with regard to IQ, socio-economic level, and school ability as estimated by teachers. Each child in two of the groups read at least five comic books per week, and some read as many as 12. One of these two groups was required to keep word lists. The third group continued with its regular reading program. All three groups showed gains in word comprehension and vocabulary, but the differences were not statistically significant.

Seashore (70) studied the size and growth of vocabulary as related to the learning of language skills. He found that conventional estimates of vocabulary size were considerably below actuality. Word growth was found to be approximately 5000 words per year, as compared to earlier estimates of around 500 words per year. On the basis of these findings, Seashore drew the following conclusions: (a) language teaching has been started far below the children's level of competence, (b) children have not been given the opportunity to develop language skills commensurate with their abilities, and (c) excessive emphasis has been placed on drill with specific words in reading and spelling when equal or greater growth could have been achieved by other means. Herzberg and others (40) have given specific suggestions to teachers for using various media in promoting learning.

The status and rate of growth of arithmetic knowledge and abilities in children in Grades I and II were studied by Brueckner (14). Brownell and Moser (13) investigated the relative merits of decomposition and of equal additions as subtraction procedures in the third grade. Evidence definitely favored the use of decomposition as the procedure to be preferred with children of average ability.

Smith (72) considered the problem of what constitutes readiness for long division in arithmetic. Five hundred fifth-grade pupils were given an intelligence test, a pretest of skills essential in long division, and a final mastery test following instruction in long division. Thru the use of correlation technics, it was found that the mastery of the essential skills is the primary factor in determining readiness for long division.

In studying the leisure-time reading of 686 junior high-school pupils, Andersen (4) found that comic books ranked first, fiction was second, with biographies and westerns third and fourth respectively. Scanlon (68) reported the 100 most popular books of children's fiction as ranked on the basis of withdrawals, over a six-month period, from a public library in St. Paul, Minnesota. It was found that 64 of the 100 most popular books were published since 1930, and that 28 of these books were animal stories.

Teaching materials for the visually handicapped child were discussed by Hughes (43) who has placed less emphasis upon special teaching technics for pupils with impaired vision, and greater emphasis upon the selection of effective materials and appropriate classroom features. Hughes described the place of such materials as maps, globes, charts, typewriters, talking books, and reading services.

Nameny (57) presented the elements of a music education program for the mentally retarded. Gunzburg (34) investigated the reading interests of subnormal boys. Continued attention has been given to the education of the gifted children. The National Education Association (59) has published a booklet, useful for the teacher, entitled *Education of the Gifted.*

The enrichment of learning at the elementary level thru the use of community resources was described by the University of Minnesota Elementary Demonstration School Faculty (54). Katona (46) has described the use of socio-drama in education, and a publication of Teachers College, Columbia University (79) gives detailed instructions on the preparation and use of sociograms.

In the area of reading, Bond and Handlan (12) have discussed the adaptation of instruction in reading to individual differences. The pamphlet is designed to serve as a reference manual for the teacher who desires better developmental, diagnostic, and remedial instruction in reading, adjusted to the ability, special interests, and needs of each child.

Some suggestions for developing clear thinking thru the teaching of geometry were given in a University of Kansas publication (45). The use of models in the teaching of geometry was described by Schacht (69). Here the emphasis is on developing geometric concepts thru the use of dynamic models. A valuable source of information regarding the history and use of surveying instruments is the Nineteenth Yearbook of the National Council of Teachers of Mathematics (47). Included is a description of appropriate and simple classroom surveying activities designed as a practical application of trigonometric and geometric principles.

Suggestions for science classroom materials and facilities were given by Raskin (66) for the elementary level, and by Miller (53) for the secondary level.

The place of group planning and activity in education was discussed in two publications of Teachers College, Columbia University (78, 80). The meaning of cooperative planning in education and various specific teacher aids are given in the *Guide to Study and Experimentation in Cooperative Planning in Education.* The mechanics of the teacher-pupil planning process with specific illustrations of application are given in *The Teacher's Role in Pupil-Teacher Planning.*

Libraries and Curriculum Centers

Libraries of curriculum, instruction, and teaching aids are the subject of articles by Spears (73), DeBernardis (24), the January 1950 issue of

Montana Education (56) and the January 1950 issue of *Educational Leadership* (35). Drag (27) studied selected current practices in the establishment and use of curriculum laboratories.

Audio-Visual Materials and Guides to Their Uses

Bibliographies and film guides include the annual and monthly publications of the H. W. Wilson Company (90). A bibliography of audio-visual materials for teachers at the elementary level has been prepared by Weinman (86). This publication includes references to materials for all elementary-grade levels—such materials as charts, graphs, maps, excursions, exhibits, museums, motion pictures, slides, radio, and recordings. A listing of audio-visual materials of special significance in the teaching of mathematics was compiled by Chapdelaine (16).

The technics of teaching with films were described by Dale (22). A Cathedral film (42) has been prepared which deals with the problem of how to use films in teaching. The establishment of a cooperative film library in districts where finances are limited was studied by Roos (67).

Films on the Teaching Process

Significant advances have recently been made in the production of audio-visual aids for teacher education. The Twenty-Ninth Yearbook of the Association for Student Teaching (6) presents the most extensive discussion in this area. In this publication consideration is given to the place and function of audio-visual materials in teacher education, the production and utilization of audio-visual materials, and the implementation of audio-visual programs. Included also is an annotated bibliography of one hundred and one selected films for teacher education. Two recent investigations clearly indicate the imperative need of better education of teachers in the use of audio-visual aids (58, 25).

Corey (20) described and evaluated five films concerned with pedagogy and teacher-pupil relationships. He considered these the best films of their kind. Several films on methods and procedures in teaching appeared during this period (3, 1, 29, 49, 77, 85).

Radio, Television, and Recordings

Radio and television received growing emphasis during the period covered by this report. Willey and Young (88) have discussed the place of radio at the elementary-school level, while Novokovsky (63) has given suggestions for the use of the radio in the teaching of the language arts.

Educational Services (30) provides a listing of educational recordings. The use of recording and playbacks in counseling was discussed by Biddle (10).

Evaluation of Audio-Visual Aids

A detailed and extensive summary of research in the area of audio-visual materials was given by Dale, Finn, and Hoban (23). This review covered the use of audio-visual materials in a variety of teaching and learning areas. Included also was a review of pertinent research on the extensiveness of audio-visual materials used by the Armed Services during the war. Knowlton (48) has prepared an evaluation form for film appraisal. The report includes a publishers' survey of films and the extent of their use.

Sterner (75) conducted an investigation of audio-visual media at the high-school level. The study was designed (a) to discover whether the medium or the interest has the greater attraction for the adolescent; (b) to investigate habits of high-school pupils in media such as radio, motion pictures, books, comic strips, newspapers, and magazines; and (c) to study adventure, humor, and love as interest in the life of adolescents. It was found that the media or print, still pictures, motion pictures, and radio are not so attractive in themselves as the material they present, and, that of the three interests—adventure, humor, and love—adventure is the favorite with adolescents.

Two research studies were concerned with the effectiveness of films in education. Smith (71) investigated the relationship between test-intelligence and pupil achievement in three situations: (a) films as the sole means of presentation, (b) teacher demonstration as sole means of presentation, and (c) a combination of films and teacher demonstrations. Positive correlations were found between intelligence and achievement. The correlations were higher for the section in which films were used exclusively, but the differences were not statistically significant.

Mitchell (55) investigated the effect of radio programs on silent reading achievement. Using 91 sixth-grade pupils, it was found that variety programs had a detrimental effect upon achievement, while musical programs had no such adverse effect. Pupils of higher ability showed gains with the musical program background.

Bibliography

1. *A Day in the Life of a Five Year Old*. 16 mm, sound, 20 min. Teachers College, Columbia University, Bureau of Publications, 525 W. 120th Street, New York 27, New York. 1949.
2. American Council on Education. *Intergroup Relations in Teaching Materials: A Survey and Appraisal*. Report of the Committee on the Study of Teaching Materials in Intergroup Relations. Washington, D. C.: the Council, 1949. 232 p.
3. *American Teacher*. 16 mm, sound, 15 min. March of Time Forum Edition, 369 Lexington Avenue, New York, New York. 1947.
4. Andersen, Esther M. "A Study of Leisure-Time Reading of Pupils in Junior High School." *Elementary School Journal* 48: 258-67; January 1948.
5. Anderson, Harold A. "Instructional Materials Useful to Teachers." *School Review* 57: 337-39 September 1949.
6. Association for Student Teaching. *Audio-Visual Materials in Teacher Education.* Twenty-Ninth Yearbook. Lock Haven, Pa.: the Association, 1950. 261 p.
7. Association for Supervision and Curriculum Development. *Toward Better Teaching: Report of Current Practices.* 1949 Yearbook. Washington, D. C.: the Association, a department of the National Education Association, 1949. 282 p.
8. Association of American Railroads. *On the Track of Some Good Teaching Aids.* Washington, D. C.: the Association, School and College Service, 1948. 8 p.

9. Barrett, Harry O. "An Examination of Certain Standardized Art Tests To Determine Their Relation to Classroom Achievement and to Intelligence." *Journal of Educational Research* 42: 398-400; January 1949.
10. Biddle, Richard A. "Play-Backs Improve My Counseling Techniques." *Clearing House* 23: 229-32; December 1948.
11. Board of Education of the City of New York. *Arithmetic, Kindergarten—Grade Three.* Curriculum Bulletin 1947-48, No. 2. New York: the Board, 1949. 74 p.
12. Bond, Guy L., and Handlan, Bertha. *Adapting Instruction in Reading to Individual Differences.* Series in Individualized Instruction, No. 5. Minneapolis: University of Minnesota Press, 1948. 82 p.
13. Brownell, William A., and Moser, Harold E. *Meaningful vs. Mechanical Learning: A Study in Grade III Subtraction.* Research Studies in Education, No. 8. Durham, N. C.: Duke University Press, 1949. 207 p.
14. Brueckner, Leo J. *Arithmetic Knowledge and Abilities of Children in Grades I and II.* Minneapolis: Educational Publishers, 1948. 100 p.
15. Bullard, Lucile L. "Evaluating Clay Modeling as an Aid in Vocabulary Building in First Grade Reading." *Mississippi Educational Advance* 39: 9-11; May 1948.
16. Chapdelaine, Perry A. *Teacher-Constructed Mathematical Motion Picture Films.* Nashville, Tenn.: George Peabody College for Teachers, 1948. 135 p. (Master's Thesis)
17. Chicago Public Schools. *Rescue Units for English I (Grade 9).* Chicago: Department of Public Instruction and Guidance, Chicago Public Schools, 1944. 104 p. (Mimeo.)
18. Corey, Stephen M. "Imperatives in Instructional Materials." *Educational Leadership* 5: 211-14; January 1948.
19. Corey, Stephen M. "Pilot Schools for Instructional Materials." *School Review* 56: 136-38; March 1948.
20. Corey, Stephen M. "Teach Training Films." *School Review* 56: 134-36; March 1948.
21. Crary, Ryland W., and others. *The Challenge of Atomic Energy.* New York: Teachers College, Columbia University, 1948. 92 p.
22. Dale, Edgar. "Teaching with Pictures." *Social Education* 12: 102-104; March 1948.
23. Dale, Edgar, and others. "Research on Audio-Visual Materials." *Audio-Visual Materials of Instruction.* Forty-Eighth Yearbook, Part I, National Society for the Study of Education. Chicago: University of Chicago Press, 1949. p. 253-83.
24. De Bernardis, Amo. "Portland's Instructional Materials Center." *Educational Screen* 28: 13-15; January 1949.
25. De Kieffer, Robert E. *The Status of Teacher-Training in Audio-Visual Education in the Forty-Eight States.* Iowa City: State University of Iowa, 1948. 148 p. (Doctor's thesis)
26. Denver Public Schools. *Manual for Using the Form for Planning and Developing an Instructional Unit.* Denver: Denver Public Schools, 1949. 8 p.
27. Drag, Francis L. "What Is a Curriculum Laboratory?" *Educational Leadership* 5: 235-40; January 1948.
28. Dresdon, Katherine W. "Current Materials: 48 Teacher Experiments in New Uses." *Clearing House* 23: 143-46; November 1948.
29. Education Through Art and Home Economics. 16 mm, sound, 12 min. Bureau of Publications, Teachers College, Columbia University, 525 W. 120th Street, New York 27, New York. 1947.
30. Educational Services. *1949. Listing of Educational Recordings for More Effective Learning.* Washington, D. C.: Educational Services, 1949. 15 p.
31. Florida State Department of Education. *A Guide for Teaching Science in the Elementary School.* Tallahassee: the Department, 1948. 88 p.
32. Florida State Department of Education. *Experiencing the Language Arts: Sequential Program from Kindergarten Through Grade 12.* Bulletin No. 34. Tallahassee: the Department, 1948. 312 p.
33. Fowlkes, John G., editor. *Elementary Teachers Guide to Free Curriculum Materials.* Randolph, Wis.: Educators Progress Service, 1950. 341 p.
34. Gunzburg, Herbert C. "The Subnormal Boy and His Reading Interests." *Library Quarterly* 18: 264-74; October 1948.
35. Hankamp, Gertrude, editor. "Materials for Instruction." *Educational Leadership* 5: 209-84; January 1948.

36. Hansen, Henry R. "Good Tools for Classrooms." *National Parent Teacher* 43: 74-76; November 1948.
37. Harvey, C. C. "A Unit of Work on the American Newspaper." *National Association of Secondary-School Principals Bulletin* 33: 65-72; January 1949.
38. Heimers, Lili. *Free Teaching Aids in Fourteen Subjects.* Montclair, N. J.: New Jersey State Teachers College, 1948. 53 p. (Mimeo.)
39. Henry, George H. "The Growth of a Unit." *English Journal* 37: 341-47; September 1948.
40. Herzberg, Max J., editor. "New Aids in Education." *Education* 70: 215-73; December 1949.
41. Hillis, Charity Ruth. *Preparation and Evaluation of Instructional Materials on Community Agencies.* Bureau of School Service Bulletin, Vol. 21, No. 2. Lexington: College of Education, University of Kentucky, 1948. 174 p.
42. *How To Teach with Films.* 16 mm, sound, 16 min. Cathedral Films, 1970 Cahuenga Boulevard, Hollywood 28, California.
43. Hughes, Bernice. "Materials and Equipment for the Partially Seeing Child." *Journal of Exceptional Children* 15: 139-43; February 1949.
44. Illinois State Department of Public Instruction. *Guide to the Study of the Curriculum in the Secondary Schools of Illinois.* Springfield: the Department, 1948. 42 p.
45. Kansas, University of. *Some Suggestions for Teaching Geometry To Develop Clear Thinking.* Department of Education Publication, Vol. 2, No. 7. Lawrence: University of Kansas, 1949. 20 p.
46. Katona, Arthur. "Social Drama in Education." *Educational Forum* 13: 462-67; May 1949.
47. Kiely, Edmund R. *Surveying Instruments, Their History and Classroom Use.* Nineteenth Yearbook, National Council of Teachers of Mathematics. New York: Teachers College, Columbia University, 1947. 411 p.
48. Knowlton, Philip A., compiler. *A Report to Educators on Teaching Films Survey.* New York: Harper and Brothers, 1948. 117 p.
49. Learning Through Cooperative Planning. 16 mm, sound, 20 min. Bureau of Publications, Teachers College, Columbia University, 525 W. 120th Street, New York 27, New York. 1948.
50. McCuskey, Dorothy, and Paukner, Lillian C. "Materials for Improved Schools." *Educational Leadership* 5: 230-35; January 1948.
51. McFadden, Merle G. "Recent Trends in the Teaching of Biology and Some Recommendations Relative to the Development of a Course of Study." *Science Education* 34: 47-51; February 1950.
52. Miller, Bernard W., editor. *Commercial Supplementary Teaching Materials.* Consumer Education Study of the National Association of Secondary-School Principals. Washington, D. C.: the Association, a department of the National Education Association, 1949. 24 p.
53. Miller, Julius S. "Experiments for the Science Class." *School Science and Mathematics* 50: 4; January 1950.
54. Minnesota, University of. *Using Community Resources.* Minneapolis: University of Minnesota Press, 1948. 102 p.
55. Mitchell, Adelle H. "The Effect of Radio Programs on Silent Reading Achievement of 91 Sixth Grade Students." *Journal of Educational Research* 42: 460-70; February 1949.
56. Montana Education. "Teaching Aids Library." *Montana Education* 26: 14-15; January 1950.
57. Nameny, Grace W. "Inaugurating a Music Education Program for Mentally Retarded." *Journal of Exceptional Children* 15: 134-38; February 1949.
58. National Education Association, Research Division. "Audio-Visual Education in City School Systems." *Research Bulletin* 24: 131-70; December 1946.
59. National Education Association and the American Association of School Administrators, Educational Policies Commission. *Education of the Gifted.* Washington, D. C.: the Commission, 1950. 88 p.
60. National Society for the Study of Education. *Learning and Instruction.* Forty-Ninth Yearbook, Part I. Chicago: University of Chicago Press, 1950. 352 p.
61. National Society for the Study of Education. *The Education of Exceptional Children.* Forty-Ninth Yearbook, Part II. Chicago: University of Chicago Press, 1950. 350 p.

62. New York, University of the State of. *Industrial Region of Western Europe. Social Studies Resource Units: Grades 5 and 6.* Albany: University of the State of New York, 1949. 38 p.
63. Novokovsky, Gertrude. "Radio and Language Arts." *Elementary English* 25: 103-108; February 1948.
64. Oftedal, Laura. "Picture Writing: A New Tool in Creative Expression." *Elementary School Journal* 49: 37-46; September 1948.
65. Potter, Gladys L. "Selecting and Using Instructional Materials." *Principal and Curriculum Building.* Twentieth Yearbook, California Elementary School Principals Association. Oakland: the Association, 1948. 171 p.
66. Raskin, Abraham. "Services and Facilities for the Elementary Science Classroom." *School Science and Mathematics* 50: 371-75; May 1950.
67. Roos, Carl A. "A Cooperative Film Library." *National Education Association Journal* 37: 625; December 1948.
68. Scanlon, William J. "One Hundred Most Popular Books of Children's Fiction Selected by Children." *Elementary English* 25: 83-97; February 1948.
69. Schacht, John F. *Manual for J. F. Schacht Dynamic Geometry Instruments.* Chicago: Welch Scientific Company, 1949. 43 p.
70. Seashore, Robert H. "The Importance of Vocabulary in Learning Language Skills." *Elementary English* 25: 137-52; March 1948.
71. Smith, Herbert A. "The Relationship Between Intelligence and the Learning Which Results from the Use of Educational Sound Motion Pictures." *Journal of Educational Research* 43: 241-49; December 1949.
72. Smith, Lawrence J. *Readiness for Two-Digit Division in Arithmetic.* Evanston, Ill.: Northwestern University, 1951. (Doctor's thesis)
73. Spears, Harold. "The School Library as the Coordinating Agency for the Curriculum." *School Review* 56: 400-403; September 1948.
74. Sperzel, Edith Z. "The Effect of Comic Books on Vocabulary Growth and Reading Comprehension." *Elementary English* 25: 109-13; February 1948.
75 Eterner, Alice P. *Radio, Motion Picture, and Reading Interests.* Contributions to Education, No. 932. New York: Teachers College, Columbia University, 1947. 102 p.
76. Strickland, Ruth G. *How To Build a Unit of Work.* Bulletin 1946, No. 5. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1946. 48 p.
77. *Teacher as Observer and Guide.* 16 mm, sound, 20 min. Bureau of Publications, Teachers College, Columbia University, 525 W. 120th Street, New York 27, New York. 1946.
78. Teachers College, Columbia University. *Guide to Study and Experimentation in Cooperative Planning.* New York: Teachers College, Columbia University, 1949. 37 p.
79. Teachers College, Columbia University. *How To Construct a Sociogram.* New York: Teachers College, Columbia University, 1947. 37 p.
80. Teachers College, Columbia University. *The Teacher's Role in Pupil-Teacher Planning.* New York: Teachers College, Columbia University, 1947. 27 p.
81. U. S. Office of Education, Federal Security Agency. *Introductory Bibliography on Atomic Energy.* Bibliography No. 2. Washington, D. C.: U. S. Office of Education, Federal Security Agency, 1949.
82. Urbancek, Joseph J., column editor. "New Teaching Aids." *Chicago Schools Journal* 28: 82-83; January-June, 1947.
83. Virginia State Department of Education. *Health Education: Grade 8-12.* Richmond: the Department, 1948. 279 p.
84. Wagner, Guy W. "Curriculum Guides Reflect Current Practices." *Educational Leadership* 8: 229-33; January 1951.
85. *We Plan Together.* 16 mm, sound, 20 min. Bureau of Publications, Teachers College, Columbia University, 525 W. 120th Street, New York 27, New York. 1948.
86. Weinman, Constance. *Bibliography on Audio-Visual Instructional Materials for Teachers in the Elementary School.* New York: Teachers College, Columbia University, 1947. 29 p.
87. Westinghouse Electric Corporation. *1947-48 Teaching Aids.* Pittsburgh: School Service, Westinghouse Electric Corporation, 1949. 24 p.

88. WILLEY, ROY D., and YOUNG, HELEN A. *Radio in Elementary Education.* Boston: D. C. Heath and Co., 1948. 450 p.

89. WILLIAMS, CATHERINE. *Sources of Teaching Material.* Columbus: Bureau of Educational Research, Ohio State University, 1949. 12 p.

90. WILSON, H. W., Co. *Educational Film Guide.* New York: H. W. Wilson Co., 1950. 163 p.

91. WISCONSIN STATE DEPARTMENT OF PUBLIC INSTRUCTION. *Guides to Curriculum Building—The Junior High School Level.* Wisconsin Cooperative Educational Planning Program, Bulletin No. 8. Madison: Wisconsin Department of Public Instruction, 1950. 181 p.

92. WOOD, HUGH B., editor. *Sources for Free and Inexpensive Teaching Materials.* Curriculum Bulletin No. 58. Eugene, Oreg.: University Cooperative Store, 1949. 22 p.

CHAPTER V

Learning Materials

HENRY J. OTTO and DONALD McDONALD

LEARNING materials are defined as materials used directly with children. Books, audio-visual aids, charts, maps, globes, exhibit materials, and objects, places, and natural phenomena constituting the focus of excursions are classified here as learning materials. The three-year period covered by this review did not include studies regarding all of these types of learning materials. The studies that were made and were attainable for this review are summarized below.

Readability and Difficulty

Three studies dealt with this aspect of learning materials. Mallinson (15) analyzed five series of elementary-school science books for Grades IV, V, and VI by means of the Flesch formula. Five 100-word samples were taken from each of the 15 books. His conclusions were: (a) textbooks in elementary science for these grades are far too difficult for those for whom they are written; (b) the average difficulty of the books for Grade IV is too difficult for the average beginning fifth-grader; (c) the sixth-grade books are only slightly difficult, probably suitable for the average sixth-grader; (d) none of them could be classed as easy reading material; (e) no indication is given that the earlier portions of the books are any easier than the later portions.

In a second study by Mallinson (14), also using the Flesch formula, 34 junior high-school textbooks in science were analyzed for reading difficulty. His findings were: (a) textbooks in all three grades are likely to cause some reading difficulty for all but the better students; (b) relative difficulty seems greatest in textbooks for Grade VII; (c) average level of difficulty of all texts for Grade VIII was below that for Grade VII; (d) there was no evidence that the easier portions of the texts are found toward the front of the books; (e) differences between the levels of difficulty of the easiest and most difficult books are statistically significant.

The reading of three of the most popular children's encyclopedias was studied by Staph (21) with the use of the Lorge formula. The reading ability of 257 children in Grades III to VI in the school in which the encyclopedias were in use was compared with the reading difficulty of the encyclopedias. The reading difficulty grade equivalent for the encyclopedias was: *World Book*, 7.23; *Britannica Junior*, 7.57; and *Compton's*, 8.0. These figures on reading difficulty merely indicate relative difficulty since each encyclopedia has a wide range of difficulty of material. The majority of scientific material was found to be less difficult than the social science content. Comparison of children's reading ability in Grades III to VI with the reading difficulty of the encyclopedias indicated that many children in Grade III could read the easier selections in any one of the encyclopedias; that in this school one-third of the third-graders had reading ability of grade 5.0 or more and hence could read the easier portions of the encyclopedias with no more assistance than would be required in an ordinary reading lesson; and that 79 percent of the fifth-graders would have difficulty using large portions of *Compton's*, and that 53 percent of the sixth-graders were capable of using most of the material in *Britannica Junior* and 64 percent could manage comfortably the materials in *World Book*.

Content

Fifteen studies explored various problems dealing with the content of learning materials. Christenberry (2) undertook a study to ascertain (a) the extent to which classical literature suitable for correlation with units in social studies and science in the primary grades was available and (b) the effectiveness of its correlation in such units. It was found that much suitable material was available. Three-hundred-seventy selections were given experimental use in four second-grade sections. Her conclusion was that the correlation plan is workable, reasonable, and should be used. Fisher's (5) analysis of 43 widely read children's books was made to determine (a) how family life appears in children's literature and (b) whether the materials on family life were suitable for teaching democratic family living. It revealed that these children's books showed realism in parent-child relations and a trend toward democratic rather than autocratic family life. The author concluded that children's literature is a rich source of material on family life and should not be overlooked as material in education for democratic living.

Vocabulary analyses were the focus of four studies. Kearney (11) analyzed the data gathered by the Works Progress Administration in a study of the vocabularies of 121 first-grade readers published between 1930 and 1940. This group of 121 books consisted of 42 preprimers, 38 primers, and 41 first readers. The words were tabulated to show frequency of occurrence of each. The study shows that the most common words in all the books are also the words that occur in 50 percent or more of the books commonly used in the first grade. There appeared to be widespread agreement that reading materials should be limited to certain words and that a high degree of repetition is desirable. Gentry (6) studied the vocabulary load of 66 preprimers published since 1930. Six hundred different words were found, 250 appearing in three or more of the preprimers and 125 in nine or more of the books. Simon (20) tried to determine the vocabulary load of nine primers, the children's connotations of certain words used in primers, and the relation between children's initial word knowledge and subsequent reading ability. Altho many words were used with several meanings, the majority of words were used with only one meaning, that meaning being the one known to most children. The investigation showed a positive but low relationship between children's initial connotations and their achievement in reading five months later. Lewry (13) analyzed 10 of the most widely used manuscript writing textbooks for first grade to ascertain the 100 words most commonly found in them. Altho these texts averaged only from 100 to 200 words each, 539 different words were found in the 10 texts; only 128 of these words were common to three or more of the books. The 100 most frequently found words are offered as a basic vocabulary for manuscript writing in first grade.

Read (18) studied the pictures found in 115 readers. Colored pictures outnumbered the black and white pictures but in a decreasing ratio as the grade level increased. As the level of the reader moves upward pictures are used less frequently, there being a sharp decrease in frequency between second and third grade.

Lampkin (12) analyzed twelve science textbooks to ascertain content devoted to teaching the scientific method of inquiry. He studied the prefaces of the books to ascertain author interest in this objective. His findings reveal that the scientific method of inquiry was a direct objective in seven books, incidental in three, and not mentioned in two. The average amount of space per book devoted to this objective was 10 percent. McClure (17) examined 47 junior and senior high-school social studies texts published between 1945 and 1949 to find the nature and amount of attention given to atomic energy. Of 11 books published in 1945 eight made no mention of atomic energy, while of the 17 books published in 1948 and 1949 only two lacked some mention of atomic energy. American and world history textbooks included more references to atomic energy than did geography, civics, and twelfth-grade social studies textbooks. The aspects of atomic energy which are most commonly treated are the bomb and the need for international control. Harsch (8) studied the science content in 134 intermediate grade readers adopted in Texas between 1919 and 1950. Her conclusions were (a) there has been an increase in the amount of science content in readers from 1919 to 1950; (b) the nature of the content reflects the development of elementary science based on the needs and interests of children; (c) readers can serve as a basis for much instruction in science.

High-school psychology textbooks were examined by Engle (4). High-school textbooks in psychology seem to have no commonly accepted content material, altho the authors are fairly well agreed on objectives. Present-day emphasis is on problems of personality and mental hygiene with less emphasis being placed on biological foundations. Very little space is devoted to technical topics of measurement and statistical technics. Johnson (10) developed criteria and then appraised 10 reading readiness books and their manuals to see if they make enough provision for developing the features of language development, mechanics of reading, and good social and work habits. The criteria used in this appraisal were developed by studying the literature in the field of reading readiness and listing the recommendations of well-known writers as to what should be included in reading readiness programs. The conclusions show that no one reading readiness book found will fulfil all the requirements of the criteria. Also, that no one book, when used alone, is adequate for planning a profitable prereading program.

Trends in the content of geography textbooks for elementary schools were determined by McAulay (16). He analyzed 30 texts for each 10-year period between 1928 and 1948. Major trends were summarized by him as follows: (a) *Objectives*—changed from the learning of specific skills about each country in 1928 to the acquisition of geographical skills necessary for the development of the one world concept in 1948. (b) *Content*—changed from the acquiring of facts for information in 1928 to the attempt in 1948 at developing attitudes and concepts thru study of essential facts concerning the place of our home as a land in the world community. (c) *Method*—increasing use from 1928 to 1948 of color, more pictorial and less written content, of suggested activities and related workbooks, and of full page colored maps and graphs. (d) *Correlation of objectives, content, and method*—objectives stated in 1928 were slightly farther removed from content and methods than in 1938 and 1948. (e) *Emphasis on social studies*—from 1928 there was a great increase in the number of texts fusing geography with social studies. (f) *Emphasis on facts*—texts of 1928 were designed for use as the principal tool of instruction, in 1948 as one of many tools. (g) *Over-all elementary pattern*—in 1928 the majority of texts were concerned with particular grades or topics, each an isolated packet having little relationship with the others, whereas, by 1948 texts were grouped, generally, into a series of three, all written by the same author or co-authors, with a developing sequence gradually enlarging the child's geographic experience from the local community to the entire world.

The use of the rural background in third-grade arithmetic books was Dreier's (3) project. The proportion of the material with a rural background was less than 3 percent in each of the six texts and not more than 25 percent could be classified as urban. Hinckley (9) investigated nine series of arithmetic textbooks published between 1940 and 1949 to determine the social ideas presented therein. His findings show that: (a) the American family as portrayed in textbooks is disjointed—women are not employed, there is lack of activities for boys and girls, and lack of mother's contact with children outside of the kitchen; (b) in looking at democratic processes special interest pressures are ignored and the complex problems of intergroup relations are avoided; (c) the economic world of textbooks fails to show the labor organizations or labor unrest, concentration of economic power in the hands of certain groups, and the area of economic planning; (d) there is little focusing of attention on peace and understanding between nations and little evidence of interest in world community.

Use of Books

Risinger (19) conducted a 10-week experiment with eight control and eight experimental eighth-grade classes to compare growth in problem-solving ability. The experimental groups were taught consumer information about housing while the control groups used traditional arithmetic materials. His conclusions were: (a) use of experimental materials may result in pupil ability to solve problems superior to pupil ability expected from use of traditional materials; (b) teachers may replace traditional text materials with consumer information on housing with confidence that pupil ability to solve problems will be enhanced; (c) actual and current data may be substituted for abstract and hypothetical data with reasonable assurance that pupil ability to solve problems will be augmented.

Hamilton's (7) study of the use of arithmetic textbooks in 50 selected classrooms showed that teachers followed rather consistently the plan of teaching suggested in the texts. The second portion of her investigation involved the introduction into these classes of 17 lessons based on best theory as determined by a review of the literature. Eighty percent of the teachers expressed preference for the newer materials.

Use of Films

If a body of information is translated into films, do people learn more if this information is presented in one long film in a single session or if presented in short films in two or more sessions? This issue was tested by Ash (1) in two separate experiments, one involving 11 classes of undergraduate psychology students and the other 10 companies of Navy recruits. The *Ape and Child* series and *The Dynamics of Experimental Neuroses,* four reels each, were used for the psychology students. Three classes were shown the whole series in a single session. Two classes were shown the series in two sessions, two reels each. Two other classes were shown each series in four sessions, one reel each. After each session the group filled out a rating form which showed something about film length and interest. One week following the mid-point of showing, a 78 item multiple choice test on the content of the films was given. A control group took the test without seeing the films. For all groups of psychology students the inter-methods differences in mean total test score may be attributed to chance fluctuations. The experiment with Navy personnel was conducted in a similar manner with similar results. The psychology groups which were shown the entire series in one session were the only groups who felt that the films were too long.

General Comment

The research studies made available during this three-year period have been summarized under the preceding four headings: Readability and

Difficulty, Content, Use of Books, and Use of Films. There were no studies of learning materials dealing with content or nature of use of community resources, concepts and meanings, use of maps, charts, globes, and exhibit materials, use of slides, or television. The writers feel justified, therefore, in saying that the range of studies was rather limited, that perhaps too much time was devoted to analyzing "what is" and not enough research effort directed toward the discovery and appraisal of new materials. Except for a few of them, the studies summarized herein represent "piecemeal packets" of research, such as are within the scope of candidates for the master's and doctor's degrees. There is noticeable absence of comprehensive, well-integrated research, the type that is feasible only for institutional research bureaus with adequate funds and personnel or other similarly established research groups. The challenge is to find ways whereby the research interests of individual students can be channeled into and become integral parts of comprehensively designed research projects.

Bibliography

1. ASH, PHILIP. *The Relative Effectiveness of Massed Versus Spaced Film Presentation.* State College, Pa.: Pennsylvania State College, 1949. 213 p. (Doctor's thesis)
2. CHRISTENBERRY, AGNES REBECCA. *Correlations in Classical Literature in the Primary Grades.* Austin: University of Texas, 1949. 147 p. (Master's thesis)
3. DREIER, WILLIAM H. "Rural Background Found in Six Third-Grade Arithmetic Texts Published Between 1942 and 1946." *Journal of Educational Research* 42: 299-306; December 1948.
4. ENGLE, THELBURN L. "An Analysis of High School Textbooks in Psychology." *School Review* 58: 343-47; September 1950.
5. FISHER, HELEN H. "Family Life in Children's Literature." *Elementary School Journal* 50: 516-20; May 1950.
6. GENTRY, LILLIAN. "A Study of the Vocabulary Load of Sixty-Six Pre-Primers." *Journal of Educational Research* 43: 525-32; March 1950.
7. HAMILTON, JEAN FRANCES. *A Study of Textbook Material in the Field of Arithmetic.* Iowa City: State University of Iowa, 1950. 288 p. (Doctor's thesis)
8. HARSCH, CLARICE ANN. *A Study of the Science Content of Texas State Adopted Intermediate Readers, 1919-1950.* Austin: University of Texas, 1950. 122 p. (Master's thesis)
9. HINCKLEY, RACHEL. *American Culture as Reflected in Mathematics Schoolbooks.* New York: Teachers College, Columbia University, 1949. 363 p. (Doctor's thesis)
10. JOHNSON, CECILIA VALENTINE. *A Critical Analysis and Appraisal of Reading Readiness Materials for First Grade.* Austin: University of Texas, 1948. 147 p. (Master's thesis)
11. KEARNEY, NOLAN C. "An Analysis of the Vocabulary of First Grade Reading Material." *Journal of Educational Research* 43: 481-93; March 1950.
12. LAMPKIN, RICHARD HENRY. *Variability in Recognizing Scientific Inquiry.* New York: Teachers College, Columbia University, 1949. 79 p. (Doctor's thesis)
13. LEWRY, MARION E. "A Writing Vocabulary for Grade I." *Elementary School Journal* 48: 88-90; October 1947.
14. MALLINSON, GEORGE G.; STURM, HAROLD E.; and MALLINSON, LOIS M. "The Reading Difficulty of Textbooks in Junior High School Science." *School Review* 58: 536-40; December 1950.
15. MALLINSON, GEORGE G.; STURM, HAROLD E.; and PATTON, ROBERT E. "The Reading Difficulty of Textbooks in Elementary Science." *Elementary School Journal* 50: 460-63; April 1950.

16. MCAULAY, JOHN DAVID EWEN. *Trends in Elementary School Geography.* Stanford University, Calif.: Stanford University, 1948. 326 p. (Doctor's thesis)
17. MCCLURE, DOROTHY. "Social-Studies Textbooks and Atomic Energy." *School Review* 57: 540-46; December 1949.
18. READ, JOHN G. "Picture Indices for Basic Readers." *Elementary School Journal* 50: 339-40; February 1950.
19. RISINGER, HUBERT BAKER. *Consumer Information in Eighth Grade Mathematics.* New Brunswick, N. J.: Rutgers University, 1949. 161 p. (Doctor's thesis)
20. SIMON, RUTH. *The Semantic Demands of Primers in Relation to Success of Pupils.* Baltimore: Johns Hopkins University, 1948. 269 p. (Doctor's thesis)
21. STAPH, RACHEL EVELYN RUTH. *Selected Problems Regarding the Use of Encyclopedias in the Wooldridge School.* Austin: University of Texas, 1950. 80 p. (Master's thesis)

CHAPTER VI

Curriculum Development

GORDON N. MACKENZIE and CLIFFORD BEBELL

SEVERAL concepts relating to curriculum development which have influenced recent studies in this area are the following: (a) it should be continuous, (b) it should be brought about by the participation of all concerned, (c) it should be primarily concerned with changes in people, (d) it should be intimately related to classroom practices, (e) it should involve recognition that changes in relationships must precede changes in forms and structures. All these concepts emphasize the process by which change is brought about rather than specific changes in the curriculum.

The research studies themselves lead to two observations. First, there has been a decline in the number of controlled experimental studies. This is probably caused by lack of faith in the representativeness of laboratory situations, with a consequent doubt as to the validity of findings from such studies. Second, there has been a growing recognition of the complexity and ambiguous nature of research in a field where each situation can be thought of as both unique and in a constant state of flux. The difficulty in developing adequate research technics in this area probably is a partial factor in the publication of a large number of proposals based upon theoretical considerations rather than upon experimental evidence.

Such recent research as has been reported tends to be based increasingly in field situations and has been referred to as action research, teacher research, developmental research, or local experimentation. This type of research is conducted for the primary purpose of improving local practices, with little regard for possible generalizations. Thus, findings are more likely to be applied to the situation in which they were discovered; but the lack of generality makes their contribution to a body of knowledge difficult to assess. The aggregate of a number of similar findings from different studies ought to be of more than local significance. Caswell (12) pointed out the need for giving careful attention to this problem.

Some attempts have been made to increase the significance of studies of local practice thru a cooperative approach. One form of this is the school study council, covering a certain geographic area, such as the Metropolitan School Study Council, or the New England Development Council. These councils have emphasized the identification and dissemination of sound educational practices. They appear to have potentiality for fostering local experimentation on a scale which would increase the generality of findings. Another form of cooperative approach is that between university agencies and local school systems. Here, the emphasis has been upon the improvement of local practices, but attempts have been made to identify and publicize those aspects of local studies which might have wider implications.

A major characteristic of research in curriculum change has been the focus on individuals involved in the process, namely, teachers, students, administrators, lay persons. Much attention has been paid to the ways in which attitudes are changed, and to the process by which a group of individuals acts together to achieve its goals.

The topics of "supervision" and "curriculum change" are combined for the first time in this issue of the REVIEW. This reflects the changing definitions of both to involve changes in people resulting from cooperative action. So far as supervision results in changes in values, understandings, skills and relationships, it leads to a changed curriculum. Similarly, curriculum improvement activities have an identical focus. Studies which deal with this concept of supervision, rather than the older notion of inspection and direct control, have often used other names for it, such as inservice education, or consultant service. Consequently the number of studies dealing with supervision as a topic is even smaller than would be accounted for by the short period of time since it was last reported in the October 1949, issue of the REVIEW.

Nature of Supervision and Curriculum Development

One analysis of the nature of curriculum development was made by Benne (6), who described curriculum change in its interrelationship with cultural change at two levels: (a) the reconstruction of the school as one of many social institutions; and (b) changes in the attitudes, habits, and skills of the students. He pointed out that some people desire to find direction for curriculum change outside of areas of current cultural struggle, while others feel that direction should come from within such controversial areas. Caswell (13) and Smith, Stanley, and Shores (66) have made more extensive analyses of the problems of curriculum improvement.

Factor (29) investigated the gap between theory and practice, and concluded that obstacles to curriculum change are set up by (a) value systems developed by individuals in their childhood, (b) the individual's need for security, (c) the authoritarian pattern in our culture, (d) the degree of spontaneity and creativity in the persons involved. She maintained that action research would help, and felt that appreciation of the worth of human beings and of their contributions was vital.

Curriculum change was thought of by Sharp (64) as being synonymous with teachers' personality development, and he pointed out the need for their "reeducation." Four processes making up this reeducation included: (a) establishing mature interpersonal relationships, (b) encouraging free expression of ideas, (c) developing insight into one's own problems, (d) testing this insight in real situations.

The Department of Curriculum and Teaching of Teachers College, Columbia University (16) presented an analysis of many significant issues and problems in curriculum development. The underlying theme was that the most important goal of such change is the meeting of needs and interests of learners in their current social situations. Three prerequisites of a good curriculum were stated to be: (a) development of socially directed group power; (b) the joint effort of all concerned; (c) people who are willing and able to change their desires, beliefs, habits, and skills. Other analyses of the nature of curriculum development were presented by Kubie (45), as a psychiatrist, and Childs (15), as a student of public affairs.

Studies specifically directed to a consideration of the nature of supervision were rare. Harman (36) surveyed the concepts of supervision held by teachers and principals in 24 high schools, and found that a majority believed it should be cooperative, while fewer believed it should involve inservice training of teachers, or the evaluation and improvement of the school's instructional program. Oliver (55) discussed the problem of supervision in the small school and concluded that the concept of cooperative supervision was fundamental. Replogle (58) asked teachers to identify areas in which they wanted help, and listed a number which were reported.

Organization for Supervision and Curriculum Development

The question of the relationship between organization and process has not been clearly defined or carefully studied. Frazier (30) examined seven school situations of various types and concluded that organization varied considerably among them and stemmed from the needs of each situation. Thelen (67) analyzed organization in terms of group structure, and identified two types: free association groups, and groups organized about a problem. Smith, Stanley and Shores (66) suggested guides for organization.

A report on the organization of various curriculum programs across the country was made by the Association for Supervision and Curriculum Development (2). Caswell (13) presented nine detailed reports on current city, county, and state curriculum programs. Toulouse (68) surveyed state and city systems and found that in most there were one or more workers with responsibility for curriculum development, altho in the cities these were usually part-time workers. He found great variation in types of city organizations for curriculum improvement. Everett (28) surveyed 83 cities, and found that the central office frequently served in an inspectional as well as in a consultant capacity. He reported little use of the individual school as an organizing unit.

Chiara (14) made an analysis of the state curriculum improvement programs, and reported a trend toward dynamic state leadership. Woods (74) made a thoro study of effects of Missouri's secondary-school curriculum program over a 10-year period. Hand (35) and Sanford (62) reported on Illinois' secondary-school study. The organization of supervisory services in California was studied by Lonsdale (48). McFaddin (49) traced the development of state-authorized supervision of rural elementary white schools in Alabama, and identified many handicaps to good supervision, including political pressures, the burden of duties not of a supervisory nature, and insufficient status for supervisors.

As mentioned before, a major trend has been toward increased use of cooperatively organized curriculum studies. The Horace Mann-Lincoln Institute of School Experimentation (42) and the Metropolitan School Study Council (51) both issued reports. In addition, Romney (60) indicated the development of similar organizations in various parts of the country. Evans (27) edited an account of a cooperative study made by Battle Creek Teachers and the Horace Mann-Lincoln Institute, while Zimmerman and Herrick (76) described quite fully a two-year cooperative child-study plan. In contrast with much of the emphasis on the efforts of local groups to improve the curriculum, Briggs (9) proposed a unified national effort including a curriculum research laboratory.

Herrick (38) presented the conceptual orientation of a cooperative study and listed the responsibilities which should be borne by the participating university staff. In another report (39), he contrasted the cooperative study with the survey, and concluded that while a community may get short-term security from the latter, it will get inservice education from the former. Edgar (25) also concluded that a cooperative survey has a contribution to make where changes in attitudes, concepts, and skills of operation are desired.

The question of organization within a single school received attention. Cragwell (22), Parody (57), Roussert (61), and Wise (72) all made studies of the development of a program or curriculum within a single school. In each situation strengths and weaknesses were weighed, and conclusions were drawn which were generally favorable both to the process employed and to the program developed.

Action Research

Emphasis upon action research has already been pointed out as one of the major characteristics of current research in curriculum development. Bristow (10), Caswell (12), and Factor (29) all emphasized the promise of this approach. Corey (18) undertook to make an analysis of the difference between fundamental and action research. He considered action research to be (a) directed to the improvement of practices in a specific situation, (b) carried out by persons who are participants in that situation, (c) possessed of a flexible design, (d) intended to result in action. Fundamental research he found to be (a) directed to the establishment of new generalizations, (b) conducted by nonparticipants, (c) possessed of an inviolable design, (d) expected to result in improvements in educational practices only as a result of the natural course of events. In other articles

(19, 20) he discussed characteristics and principles of action research, and the conditions conducive to curriculum experimentation.

A study group of the Horace Mann-Lincoln School (43) made recommendations for the carrying out of group research by teachers, in which they identified characteristics of such work. In particular, they suggested that the study of many interrelated factors in one situation might well be as meaningful as the study of one factor in many situations. Wann (70) reported on the role of teachers in action research in the Springfield, Missouri, schools. Wrightstone (75) proposed action-research programs for research bureaus.

Group Procedures

Group procedures constituted a part of almost every discussion and study of curriculum change. In fact, the emphasis upon this matter has been so great as to suggest that preoccupation with it may be limiting study in other directions. Of course, many studies have been made of group process in other areas than that of curriculum development, and these have been reported on in other issues of the REVIEW. In the last three-year cycle, material dealing with some aspect of this topic has been included in the issues of April, June, and December 1948; June, October, and December 1950.

Studies directly relating group process to curriculum change were not plentiful. Benne and Muntyan (7) compiled an extensive set of readings designed to relate these two topics. The Association for Supervision and Curriculum Development (3) published an extensive discussion of the use of group processes in supervision. Anderson and his associates (1) analyzed the process by which a staff might select a problem for group work. Lawler (46) described certain phases of problem definition. Witt (73) analyzed obstacles to effective communication and proposed correctives.

Practices and Procedures for Supervision and Curriculum Development

Many studies have been made with regard to various devices suggested and used for facilitating curriculum change and improving participation in such change, but few have been accompanied by supportive evidence. The Metropolitan School Study Council (52) identified five patterns of public participation in curriculum change. Frazier (30) reported the practices which seven different school situations had in common in working on curriculum change. *Educational Leadership* (26) presented questionnaire responses from 22 individuals with responsibility for instructional improvement, with regard to successful procedures.

Curriculum implications of the armed forces educational programs were studied by Goodman (32), who found that effectiveness of curriculum work was increased by close liaison between the curriculum workers and those familiar with the situations for which the learners were training. He suggested that schools invite interested persons to participate in developing the curriculum. Friedman (31) found that parents felt that many topics stressed by the school were not important, and suggested that schools try to discover what the needs of pupils and adults really are. Hoppe (41) analyzed the nature of student participation in over 100 schools replying on a questionnaire. Cooper (17) suggested ways in which a college faculty might start thinking about and building toward a general education program. Bishop (8) reported on Northwest Missouri State College's experience in the formulation of objectives. Romine (59) proposed that the development of educational objectives start with the teacher and his work rather than with a philosophy of education.

A number of specific technics were examined. Eckhardt (24) analyzed the specific activities of a number of principals with regard to the curriculum. The work of the consultant was reported on by Lawler (47). The committee method was stated by Goodman (32) to be invaluable to the Navy in giving direction, but so cumbersome and slow in operation that they came increasingly to rely on specialists. Unruh (69) surveyed state leadership practices in respect to junior college curriculum development. The First Assistants Association of New York City School System (53) questioned teachers and principals regarding classroom visitation by departmental chairmen. They found four out of five teachers had faith in this technic, altho informal conferences and talks rated higher. Principals, too, thought that reports of class visits, plus conferences, helped significantly to improve teaching. Greene and Woodruff (33) reported on the use of standardized tests by teachers, followed by remedial work, and thought that this made optimum use of supervisors' skills. White (71) suggested that the device of having teachers rate their administrators would, if agreed to willingly by the administrators, help improve supervision.

Reports were made of a great many specific instances of the use of various technics and procedures, but with little attempt to do more than describe and evaluate them informally. Drag (23) presented descriptions of curriculum laboratories in the United States. Herrick and others (40) reported a preschool planning conference; Haskew (37) defined the educational clinic. Workshops, curriculum councils, and many other technics and procedures were reported on in this fashion. Grim (34) reported a number of studies and different approaches to curriculum development. Barton (5) analyzed several definitions of educational objectives on the basis of sources, the process of defining, and means of clarifying. There seems to be great need, however, for carefully considered attempts to study and appraise specific devices. Four such studies were made: Olson (56), on local planning conferences; Meier (50), on the work-group-conference method; Corey and Halverson (21) reported on the use of sociometric analyses to improve workshops; Selmeier (63), on the work of national committees over a 50-year period.

Trends and Needed Research

Shores (65) reviewed the research on elementary-school curriculum organization for the period, 1890-1949, and identified such trends as: (a) curriculum revision coming to be thought of as continuous, (b) state legislatures assuming an increasing role in determining the objectives and organization of the curriculum, (c) curriculum workers increasingly concerned with translating democratic living into specific goals and objectives, (d) more time being devoted to problems of social living. Bacon (4) and Newsom (54) also studied trends in curriculum planning, and corroborated most of the above. Burt (11) investigated the origin and development of supervision in institutions of higher learning, in terms of the frequency of its mention in various publications. He found that attention to this topic increased until the early 30's and declined thereafter. Jobe (44) traced the history of curriculum development in Mississippi public white high schools.

Zirbes (77) called attention to gaps in curriculum research, and pointed out the need to examine the following: (a) implications of social change and fundamental research for the curriculum, (b) assumptions currently being made concerning the curriculum implications of motives and attitudes, (c) unstated assumptions underlying certain widespread curriculum practices and materials, (d) resistance to educational advance, (e) clarification of terms used for changing concepts and connotations. Questions on which research is much needed were listed by Benne (6), as follows: (a) How should direction for curriculum change be found? (b) Should this change be periodic or continuous? (c) What experts does a school system need? (d) What is the responsibility of colleges? of government? (e) What is needed in the way of competency in human relations? (f) What is the interrelationship between curriculum research and curriculum development? This last question was also discussed by Bristow (10), who stated that attention in research should be directed to: (a) speed-up of educational lag; (b) design of the curriculum; (c) participation of school personnel; (d) agreement among educational institutions, agencies, and schools about curriculum problems; (e) evaluation; (f) place of research in curriculum programs; (g) pooling of know-how on developmental, or action research; (h) design of experiments. Factor (29) indicated three important jobs: development of new measuring tools to get evidence on school success; better communication of research results to the public; research into organized obstruction to change.

Caswell (12) pointed out the falling off of the amount of curriculum research in the last 20 years, and the need for reversing this trend. He found action research to be an encouraging development, provided that careful attention is given to the matter of generalization. Limitations in curriculum research were identified to be: (a) inadequate personnel, (b) too few funds, (c) reluctance of school systems to share responsibility for curriculum development with universities, (d) difficulty in implementation of results.

Certain research needs might be added to those listed above, or might be reemphasized as particularly pressing areas for study: (a) increasing the generality of action research, (b) applying experimental findings in group process from other fields to that of curriculum change, (c) relating process to organization in curriculum change, (d) developing a methodology of cooperative research, (e) relating evaluation to curriculum improvement, (f) studying curriculum development at the college and adult levels.

Bibliography

1. Anderson, Robert H., and others "The Selection of the Problem for Staff Work." *Educational Administration and Supervision* 33: 339-48; October 1947.
2. Association for Supervision and Curriculum Development. *Building Public Confidence in the Schools.* Washington, D. C.: the Association, 1949. 60 p.
3. Association for Supervision and Curriculum Development. *Group Processes in Supervision.* Washington, D. C.: the Association, 1948. 130 p.
4. Bacon, Francis L. "Curriculum Planning in America." *Bulletin of the National Association of Secondary-School Principals* 31: 63-68; October 1947.
5. Barton, George E., Jr. "The Derivation and Clarification of Objectives." *Journal of Educational Research* 41: 624-39; April 1948.
6. Benne, Kenneth D. "An Approach to Issues Underlying Curriculum Development." *Journal of Educational Research* 41: 561-76; April 1948.
7. Benne, Kenneth D., and Muntyan, Bozidar. *Human Relations in Curriculum Change.* Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 7. Springfield, Ill.: Office of the State Superintendent of Public Instruction, 1949. 316 p.
8. Bishop, Clifford L. "A College Cooperates in Formulating Its Objectives." *Educational Administration and Supervision* 36: 45-53; January 1950.
9. Briggs, Thomas H. "Eventually—Why Not Now?" *Bulletin of the National Association of Secondary-School Principals* 34: 195-207; April 1950.
10. Bristow, William H. "The Place of Research in Curriculum Development." *Improving Educational Research.* Official Report of 1948 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1948. p. 145-48.
11. Burt, Allan. "Supervision of Instruction." *Peabody Journal of Education* 25: 208-17; March 1948.
12. Caswell, Hollis L. "Research in the Curriculum." *Educational Leadership* 7: 438-45; April 1950.
13. Caswell, Hollis L., and others. *Curriculum Improvement in Public School Systems.* New York: Teachers College, Columbia University, 1950. 462 p.
14. Chiara, Clara R. *A Critical Study of the Secondary School Curriculum Development Programs of the State Departments of Education.* Columbus: Ohio State University, 1948. 465 p. (Doctor's thesis)
15. Childs, John L. "A Student of Public Affairs Views the Problem of Curriculum Development." *Teachers College Record* 50: 232-40; January 1949.
16. Brunstetter, Max R., editor. "Toward Curriculum Improvement." *Teachers Record* 50: 289-369; February 1949.
17. Cooper, Russell N. "Faculty Adventures in Educational Planning." *Journal of General Education* 2: 35-40; October 1947.
18. Corey, Stephen M. "Action Research, Fundamental Research, and Educational Practice." *Growing Points in Educational Research.* Official Report of 1949 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1949. p. 261-65.
19. Corey, Stephen M. "Conditions Conducive to Curricular Experimentation." *Educational Administration and Supervision* 36: 209-16; April 1950.
20. Corey, Stephen M. "Curriculum Development through Action Research." *Educational Leadership* 7: 147-53; December 1949.

21. Corey, Stephen M., and Halverson, Paul M. "Some Inter-Personal Relations in a Curriculum Work Conference." *Teachers College Record* 52: 98-106; November 1950.
22. Cragwell, Sarah E. *A Plan for Cooperative Action by Home Economics Staff and Students at Winthrop College to Evolve a Functional Departmental Program for the First Two Years.* New York: Teachers College, Columbia University, 1949. 124 p. (Doctor's thesis)
23. Drag, Francis L. *Curriculum Laboratories in the United States.* Education Monograph, No. 15. San Diego: Curriculum Laboratory, Office of the Superintendent of Schools, San Diego County, 1947. 172 p.
24. Eckhardt, John W. *A Study of the High School Principalship in Its Relation to Curriculum Development.* Los Angeles: University of Southern California, 1946. 292 p. (Doctor's thesis)
25. Edgar, Robert Wilson. *A Study of the Techniques and Procedures for Curriculum Improvement in the Great Neck Cooperative Survey.* New York: Teachers College, Columbia University, 1949. 230 p. (Doctor's thesis)
26. Educational Leadership. "Some Hints to Leadership Needs." *Educational Leadership* 6: 135-43; December 1948.
27. Evans, Hubert, editor. "Cooperative Research and Curriculum Improvement." *Teachers College Record* 51: 407-74; April 1950.
28. Everett, J. Bernard. *The Administration of Curriculum Programs in Selected City School Systems.* New York: Teachers College, Columbia University, 1949. 168 p. (Doctor's thesis)
29. Factor, Bernice. "Curriculum Change in Relation to Certain Psychological and Cultural Factors." *Harvard Educational Review* 19: 219-30; Fall 1949.
30. Frazier, Alexander, editor. "Organization Stems from the Situation." *Educational Leadership* 6: 441-48, 470; 1949.
31. Friedman, Kopple C. "Utilizing the Community in Curriculum Development." *School Review* 56: 357-60; June 1948.
32. Goodman, Samuel M. *Curriculum Implications of Armed Services Educational Programs.* Washington, D. C.: American Council on Education, 1947. 101 p.
33. Greene, James E., and Woodruff, Wilda. "A Testing Program for Promoting Improved Supervision." *Growing Points in Educational Research,* Official Report of 1949 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1949. p. 155-58.
34. Grim, Paul R. "Designs for Curriculum Development." *Journal of Educational Research* 42: 18-29; September 1948.
35. Hand, Harold C. *Principal Findings of the 1947-1948 Basic Studies of the Illinois Secondary School Curriculum Program.* Circular Series A, No. 51, Illinois Secondary School Curriculum Program, Bulletin No. 2. Springfield, Ill.: Office of the State Superintendent of Public Instruction, 1949. 78 p.
36. Harman, Allen C. *Supervision in Selected Secondary Schools.* Philadelphia: University of Pennsylvania, 1947. 181 p.
37. Haskew, Laurence D. *The Educational Clinic.* Washington: American Council on Education, 1949. 51 p.
38. Herrick, Virgil E. "Conceptual Orientation of a Co-operative Study." *Elementary School Journal* 49: 330-40; February 1949.
39. Herrick, Virgil E. "The Survey Versus the Cooperative Study." *Educational Administration and Supervision* 34: 449-58; December 1948.
40. Herrick, Virgil E.; Johnston, A. M.; and Pease, James E. "What Makes a Good Preschool Planning Conference?" *Elementary School Journal* 49: 438-45; April 1949.
41. Hoppe, Arthur A. *Student Participation in Curriculum Improvement.* New York: Teachers College, Columbia University, 1947. 156 p. (Doctor's thesis)
42. Horace Mann-Lincoln Institute of School Experimentation. "A Progress Report." *Teachers College Record* 49: 305-62; February 1948.
43. Horace Mann-Lincoln Study Group. "Recommended: Group Research for Teachers." *Teachers College Record* 50: 108-13; November 1948.
44. Jobe, Euclid R. *Curriculum Development in Mississippi Public White High Schools, 1900-1945.* Nashville, Tenn.: George Peabody College for Teachers, 1950. 199 p. (Doctor's thesis)
45. Kubie, Lawrence S. "The Psychiatrist Considers Curriculum Development." *Teachers College Record* 50: 241-46; January 1949.

46. LAWLER, MARCELLA R. "Important Phases of Problem Definition in Curriculum Improvement." *Teachers College Record* 51: 537-43; May 1950.
47. LAWLER, MARCELLA R. *The Work of the Consultant.* New York: Teachers College, Columbia University, 1949. 187 p. (Doctor's thesis)
48. LONSDALE, BERNARD J. *General Supervision of Instruction and Curriculum in the Public Elementary School Systems of California.* Berkeley: University of California, 1950. 289 p. (Doctor's thesis)
49. MCFADDIN, GENORA. *The Development of State-Authorized Supervision of Rural Elementary White Schools in Alabama.* Contribution to Education, No. 409. Nashville, Tenn.: George Peabody College for Teachers, 1949. 228 p.
50. MEIER, ARNOLD R. *A Study of a Work-Group-Conference Method for Producing Curriculum Change.* Detroit: Wayne University, 1949. 279 p. (Doctor's thesis)
51. METROPOLITAN SCHOOL STUDY COUNCIL. "A Progress Report." *Teachers College Record* 50:1-59; October 1948.
52. METROPOLITAN SCHOOL STUDY COUNCIL, SUBCOMMITTEE OF THE COMMITTEE ON LAY UNDERSTANDING. *Public Action for Powerful Schools.* Metropolitan School Study Council Research Studies, No. 3. New York: Teachers College, Columbia University, 1949. 85 p.
53. NEW YORK CITY PUBLIC SCHOOLS, FIRST ASSISTANTS ASSOCIATION, COMMITTEE ON PROBLEMS OF SUPERVISION. "A Study of Chairman's Reports on Class Visits." *High Points* 30: 33-51; February 1948.
54. NEWSOM, NATHAN W. "Recent Trends in Curriculum Building in the Secondary School." *Bulletin of the National Association of Secondary-School Principals* 32: 116-23; November 1948.
55. OLIVER, A. I. *The Curriculum of the Small High School.* Boulder: University of Colorado, 1948. 381 p. (Doctor's thesis)
56. OLSON, MYRON S. *Local Planning Conferences in North Central Association High Schools.* Iowa City: State University of Iowa, 1950. 307 p. (Doctor's thesis)
57. PARODY, OVID FRANK. *The Process of Initiating and Developing a New Curriculum at the Drum Hill Junior High School, Peekskill, New York.* New York: Teachers College, Columbia University, 1948. 85 p. (Doctor's thesis)
58. REPLOGLE, VERNON L. "What Help Do Teachers Want?" *Educational Leadership* 7: 445-49; April 1950.
59. ROMINE, STEPHEN A. "A Dual Approach to the Development of Educational Objectives." *Educational Administration and Supervision* 34: 459-67; December 1948.
60. ROMNEY, MILES C. "The Metropolitan Cooperative School Study Movement." *Improving Educational Research.* Official Report of 1948 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1948. p. 125-29.
61. ROUSSERT, SISTER MARY BERNICE. *Initiation of a Core Curriculum, St. Vincent High School, Akron, Ohio.* New York: Teachers College, Columbia University, 1949. 177 p. (Doctor's thesis)
62. SANFORD, CHARLES W. "Challenging Developments in the Illinois Secondary School Curriculum Program." *Bulletin of the National Association of Secondary-School Principals* 33: 57-65; April 1949.
63. SELMEIER, HENRY L. *Curriculum Construction by National Committees, 1880-1930.* New Haven, Conn.: Yale University, 1948. 515 p. (Doctor's thesis)
64. SHARP, GEORGE M. *Curriculum Development as Reeducation.* New York: Teachers College, Columbia University, 1949. 161 p. (Doctor's thesis)
65. SHORES, JAMES HARLAN. *A Critical Review of the Research on Elementary School Curriculum Organization, 1890-1949.* University of Illinois Bulletin, Vol. 47, No. 8. Urbana, Ill.: the University, 1949. 29 p.
66. SMITH, B. OTHANEL; STANLEY, WILLIAM O.; and SHORES, J. HARLAN. *Fundamentals of Curriculum Development.* New York: World Book Company, 1950. Part V, p. 620-723.
67. THELEN, HERBERT A. "Engineering Research in Curriculum Building." *Journal of Educational Research* 41: 577-96; April 1948.
68. TOULOUSE, ROBERT B. *An Analysis of the Secondary School Curriculum Improvement Policies and Practices of States and Cities.* Columbia: University of Missouri, 1948. 323 p. (Doctor's thesis)
69. UNRUH, ADOLPH. "State Leadership in Junior College Curriculum Development." *School Review* 58: 475-78; November 1950.

70. WANN, KENNETH D. *Teacher Participation in Action Research Directed Toward Curriculum Change.* New York: Teachers College, Columbia University, 1950. 240 p. (Doctor's thesis)
71. WHITE, KENNETH B. "The Improvement of Educational Administration and Supervision." *Educational Administration and Supervision* 35: 181-84; March 1949.
72. WISE, WILLIAM MAX. *Developing a Guidance Program Through Social Process.* New York: Teachers College, Columbia University, 1948. 139 p. (Doctor's thesis)
73. WITT, PAUL. "Effective Communication in Curriculum Development." *Teachers College Record* 51: 286-95; February 1950.
74. WOODS, BOB G. *Certain Effects of Missouri's Secondary School Curriculum Development Program, 1938-1949.* Iowa City: State University of Iowa, 1950. 316 p. (Doctor's thesis)
75. WRIGHTSTONE, JACOB WAYNE. "Research-Action Program for Research Bureaus." *Improving Educational Research.* Official Report of 1948 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1948. p. 29-34.
76. ZIMMERMAN, ELIZABETH, and HERRICK, VIRGIL E. "A Child Study Program: One Phase of a Cooperative Study." *Educational Administration and Supervision* 35: 193-205; April 1949.
77. ZIRBES, LAURA. "Gaps in Curriculum Research." *Educational Leadership* 7: 187-92; December 1949.

SUPPLEMENTARY DIRECTORY

(The latest complete membership list was published in the December 1950 issue of the REVIEW. The following list indicates new members since that date.)

ACTIVE MEMBERS

* **Blackwell, Sara E.,** Assistant Professor, Home Economics Education Department, Cornell University, Ithaca, New York.

Bou, Ismael Rodriguez, Professor of Psychology, University of Puerto Rico, Rio Piedras, Puerto Rico.

Burnham, Paul S., Assistant Professor of Psychology, Yale University, New Haven, Connecticut.

Carroll, John B., Assistant Professor of Education, Graduate School of Education, Harvard University, Cambridge 38, Massachusetts.

Cason, Eloise B., Director of Child Guidance, Bloomfield Public Schools, Bloomfield, New Jersey.

Cheyney, W. Walker, Director, Division of Educational Research, Board of Public Education, Philadelphia 3, Pennsylvania.

Coleman, Gerald Max, Director, Instruction and Research, St. Joseph Public Schools, St. Joseph, Missouri.

Crossley, B. Alice, Assistant Professor, School of Education, Boston University, Boston, Massachusetts.

Cynamon, Manuel, Assistant Director, Office of Evaluation and Educational Research, Brooklyn College, Brooklyn 10, New York.

Dahnke, Harold L., Jr., Assistant Professor, Board of Examiners, Michigan State College, East Lansing, Michigan.

Ford, Roxana Ruth, Associate Professor, Home Economics Education, University of Minnesota, St. Paul 1, Minnesota.

Gardner, Eric F., Associate Professor of Educational Statistics, School of Education, Syracuse University, Syracuse, New York.

Gregg, George W., Educational Consultant (Evaluation), Air University, Maxwell Air Force Base, Alabama.

Grim, Paul R., Chairman, Department of Theory and Practice of Teaching and Director of Laboratory Experiences, College of Education, University of Minnesota, Minneapolis 14, Minnesota.

Harris, Albert J., Director of Educational Clinic and Associate Professor of Education, Queens College, Flushing, New York.

Hunt, Jacob T., Assistant Professor of Education and Head, Junior-Senior Division of Reading Improvement Service, Western Reserve University, Cleveland, Ohio.

Johns, Roe L., Professor, School Administration, University of Florida, Gainesville, Florida.

Johnson, A. Pemberton, Project Director, Educational Testing Service, 20 Nassau Street, Princeton, New Jersey.

Kozelka, Paul, Associate Professor of Speech, Teachers College, Columbia University, New York 27, New York.

Lambert, Sam M., Assistant Director, Research Division, National Education Association, 1201 Sixteenth Street, N.W., Washington 6, D. C.

Lazar, Nathan, Associate Professor of Mathematical Education, Ohio State University, Columbus 10, Ohio.

Lee, J. Murray, Dean, School of Education, State College of Washington, Pullman, Washington.

Lewerenz, Alfred Speir, Head Supervisor, Evaluation Section, Los Angeles City Schools, Los Angeles 15, California.

Luther, Mrs. Gertrude Hawkins, Bureau of Educational Research, Board of Education, Cleveland, Ohio.

McClelland, James N., Instructor, School of Medicine, University of California, San Francisco 16, California.

McConagha, Glenn Lowery, Director, United States Armed Forces Institute, 102 North Hamilton Street, Madison 3, Wisconsin.

---

* Changed from associate to active member in 1951.

McLaughlin, Kenneth F., Assistant Professor, Department of Mathematics, U. S. Naval Academy, Annapolis, Maryland.

Mallinson, George Greisen, Professor of Psychology and Education, Western Michigan College of Education, Kalamazoo, Michigan.

Ohlsen, Merle M., Associate Professor of Education, College of Education, University of Illinois, Champaign, Illinois.

Phipps, George C., Principal, J. N. Thorp School, Chicago, Illinois.

Pond, Frederick L., Supervising Curriculum Consultant, Department of Public Instruction, Education Building, Harrisburg, Pennsylvania.

Powell, Jackson O., Dean, School of Education, University of Wichita, Wichita, Kansas.

* **Prescott, George A.,** Test Editor, World Book Company, Yonkers 5, New York.

Pugmire, D. Ross, Professor of Education, University of Oklahoma, Norman, Oklahoma.

Reiner, William B., Research Assistant, Bureau of Educational Research, Board of Education of the City of New York, 110 Livingston Street, Brooklyn 2, New York.

Rhum, Gordon J., Assistant Professor of Education, Iowa State Teachers College, Cedar Falls, Iowa.

Rummel, J. Francis, Assistant Professor of Education, University of Oregon, Eugene, Oregon.

Ryan, W. Carson, Kenan Professor of Education, University of North Carolina, Chapel Hill, North Carolina.

See, Harold W., Assistant Professor of Education, Teachers College, University of Cincinnati, Cincinnati, Ohio.

* **Shane, Harold G.,** Professor of Education, School of Education, Northwestern University, Evanston, Illinois.

Shevenell, Rev. Raymond H., O.M.I. Director, Institute of Psychology, University of Ottawa, Ontario, Canada.

Stewart, Lawrence H., Assistant Professor of Educational Psychology, George Peabody College for Teachers, Nashville, Tennessee.

Stewart, Robert C., Director of Research and Publications, State Department of Public Instruction, Dover, Delaware.

Stone, Marguerite M., Director of Research, Montgomery County Board of Education, Rockville, Maryland.

Tyler, Louise L., Teacher and Chairman, Committee on Institutional Research, Chicago Teachers College, 6800 South Stewart Avenue, Chicago, Illinois.

Van Auken, Robert A., Director of Research, Schenectady Public Schools, Schenectady, New York.

Vredevoe, Lawrence E., Director, Bureau of School Services and Associate Professor of Education, University of Michigan, Ann Arbor, Michigan.

Walker, George H., Jr., Acting Chairman, English Department and Director of Reading Program, Southern University, Baton Rouge, Louisiana.

Washton, Nathan S., Assistant Professor, Department of Education, Queens College, Flushing, New York.

Weaver, Edward K., Chairman, Division of Education, Bishop College, Marshall, Texas.

Winans, S. David, Supervisor of Research, New Jersey Department of Education, 175 West State Street, Trenton 8, New Jersey.

Yeomans, Alice V., American Council on Education, 1785 Massachusetts Avenue, N.W., Washington, D. C.

---

* Changed from associate to active member in 1951.

ASSOCIATE MEMBERS

Bebell, Clifford F. S., Research Assistant, The City College, New York, New York.

Bonney, Linwood K., Guidance Director, Roger Ludlowe High School, Fairfield, Connecticut.

Clark, Rodney A., Director of Guidance, Webster High School, Webster, Texas.

Cosman, Charles B., Supervising Principal, Islip High School, Islip, New York.

Curry, Guy A., Jr., Coordinator of Teacher Education and Certification, Oklahoma State Department of Education, Oklahoma City, Oklahoma.

Davis, Warren M., Director of High Schools, Alliance Public Schools, Alliance, Ohio.

Dowdell, Susan, Elementary Supervisor, Hillsborough County Schools, Tampa, Florida.

Fields, Ralph R., Director of Division of Instruction and Professor of Education, Teachers College, Columbia University, New York 27, New York.

Gardner, Rev. Laurence R., Superintendent of Parochial Schools, Manchester, New Hampshire.

Hamilton, Jean F., Assistant Professor of Education, College of Education, Butler University, Indianapolis 7, Indiana.

Hoover, Cecile Annette, Assistant Professor, Foods and Nutrition, Tuskegee Institute, Alabama.

Jones, George Julius, Assistant Professor of Education, Agricultural, Mechanical and Normal College, Pine Bluff, Arkansas.

Judy, Jack, Graduate Student, Teachers College, Columbia University, New York 27, New York.

Langbell, D. P., Superintendent of Public Schools, Kalispell, Montana.

Lee, Thomas L., Director, Curriculum and Publications, Fort Smith Public Schools, Fort Smith, Arkansas.

Martin, John Henry, Principal, Kingston High School, Kingston, New York.

Mitchell, Mrs. Helen deRamus, Public Health Educator, New York City Department of Health, New York, New York.

Moore, E. Carleton, Audio Visual Director and Curriculum Coordinator, Hempstead Public Schools, Hempstead, New York.

Pratt, Olga L., Director, Bartram School, Jacksonville 7, Florida.

Robinson, Gilbert L., Principal, Taft Junior High School, Oklahoma City 7, Oklahoma.

Robinson, Robert B. (Retired), 4243 Garfield Avenue, Kansas City 4, Missouri.

Silverman, Harold, Graduate Student, Washington University, St. Louis 1, Missouri.

Sizer, Woodrow J., Supervising Principal, Wabeno Joint School District No. 1, Wabeno, Wisconsin.

Sobesky, William R., Assistant Principal, Junior High School, Barbour Intermediate School, Detroit 4, Michigan.

Tolbert, Elias L., Graduate Student, Columbia University, New York 27, New York.

Walther, Herbert K., Chairman, Department of Education, University of Denver, Denver, Colorado.

Young, R. C., Principal, Woodrow Wilson Junior High School, Decatur, Illinois.

LIST OF ACTIVE MEMBERS BY STATES

Alabama
Gregg, George W.

California
Lewerenz, Alfred Speir
McClelland, James N.

Canada
Shevenell, Rev. Raymond H.

Connecticut
Burnham, Paul S.

Delaware
Stewart, Robert C.

District of Columbia
Lambert, Sam M.
Yeomans, Alice V.

Florida
Johns, Roe L.

Illinois
Ohlsen, Merle M.
Phipps, George C.
Shane, Harold G.
Tyler, Louise L.

Iowa
Rhum, Gordon J.

Kansas
Powell, Jackson O.

Louisiana
Walker, George H., Jr.

Maryland
McLaughlin, Kenneth F.
Stone, Marguerite M.

Massachusetts
Carroll, John B.
Crossley, B. Alice

Michigan
Dahnke, Harold L., Jr.
Mallinson, George Greisen
Vredevoe, Lawrence E.

Minnesota
Ford, Roxana Ruth
Grim, Paul R.

Missouri
Coleman, Gerald Max

New Jersey
Cason, Eloise B.
Johnson, A. Pemberton
Winans, S. David

New York
Blackwell, Sara E.
Cynamon, Manuel
Gardner, Eric F.
Harris, Albert J.
Kozelka, Paul
Prescott, George A.
Reiner, William B.
Van Auken, Robert A.
Washton, Nathan S.

North Carolina
Ryan, W. Carson

Ohio
Hunt, Jacob T.
Lazar, Nathan
Luther, Mrs. Gertrude Hawkins
See, Harold W.

Oklahoma
Pugmire, D. Ross

Oregon
Rummel, J. Francis

Pennsylvania
Cheyney, W. Walker
Pond, Frederick L.

Tennessee
Stewart, Lawrence H.

Texas
Weaver, Edward K.

Washington
Lee, J. Murray

Wisconsin
McConagha, Glenn Lowery

Puerto Rico
Bou, Ismael Rodriguez

LIST OF ASSOCIATE MEMBERS BY STATES

Alabama

Hoover, Cecile Annette

Arkansas

Jones, George Julius
Lee, Thomas L.

Connecticut

Bonney, Linwood K.

Colorado

Walther, Herbert K.

Florida

Dowdell, Susan
Pratt, Olga L.

Illinois

Young, R. C.

Indiana

Hamilton, Jean F.

Michigan

Sobesky, William R.

Missouri

Robinson, Robert B.
Silverman, Harold

Montana

Langbell, D. P.

New Hampshire

Gardner, Rev. Laurence R.

New York

Bebell, Clifford F. S.
Cosman, Charles B.
Fields, Ralph R.
Judy, Jack
Martin, John Henry
Mitchell, Mrs. Helen deRamus
Moore, E. Carleton
Tolbert, Elias L.

Oklahoma

Curry, Guy A., Jr.
Robinson, Gilbert L.

Ohio

Davis, Warren M.

Texas

Clark, Rodney A.

Wisconsin

Sizer, Woodrow J.

Index to Volume XXI, No. 3

Page citations are made to single pages; these are often the beginning of a chapter, section or running discussion dealing with the topic.

Action research, 230
Atomic energy, 204, 209; treatment in texts, 222
Audio-visual aids, 214; effectiveness, 215; evaluation, 214

Camping, 198
Citizenship education, 203
Community participation in curriculum planning, 173, 177
Core curriculum, 200
Curriculum, 196, 227; content, 191; development, 199, 227; elementary education, 190, 196; factors influencing, 190; higher education, 202; legal controls, 181; needed research, 233; objectives and goals, 179; organization, 196; planning, 177, 182; research, 227; secondary education, 190, 198; trends, 196, 198, 233; values, 175

Driver education, 199

Educational psychology, 186; in teacher training, 191; texts, 190
Educational sociology, 182
Encyclopedias, 220
Exceptional children, 203; learning, 189; methods of teaching, 211

Factors influencing curriculum, 174; economic, 174; nationally organized groups, 175; sociological and social, 174
Family life education, 182
Films, use of, 224

General education, 180, 202
Group methods, 192, 213, 231

Health education, 199
Human relations, teaching of, 204

Learning, 186; and the curriculum, 186, 188; exceptional children, 189; theory, 188
Learning materials, 220; content, 221; readability and difficulty of, 220
Legal control of education, 181
Libraries, curriculum, 213
Life adjustment education, 202

Mental hygiene and guidance, 188
Methods of teaching, 211; arithmetic, 191, 212; exceptional children, 211; films on, 214; geometry, 191, 213; language skills, 212; reading, 213

Needed research, curriculum, 233; learning materials, 225

Objectives and goals of the curriculum, 173, 179, 186
Organization of the curriculum, 196

Philosophy, 173

Radio, 214
Recordings, 214
Religious education, 176, 197; church and state, 177; place in secular education, 176
Research, hypotheses for, 186; responsibility for, 182
Resource units, 209

Social learning, 191
Student participation in curriculum planning, 182
Supervision and curriculum development, 228; nature of, 228; organization for, 229; practices and procedures, 231; technics, 231

Teaching materials, 209; evaluation of, 182, 210; for visually handicapped, 213; sources of, 210, 214
Television, 214
Textbooks, 220; arithmetic, 223; evaluation of, 182; geography, 223; readability and difficulty of, 220; readers, 221; psychology, 222; science, 222; use of, 224

Values, 175

Work experience, 202,

478 Z'18

FOREWORD

This is another in a series of numbers of the Review devoted to summarization of research in the fields of mathematics and science. In general the method of procedure of the committee preparing this number has been the same as that of its predecessors. It will be noted that three chapters are devoted to science and three to mathematics. Not quite the same division of labor was followed in the setting up of the chapters covering the two subjects. In general, workers in the field of the teaching of science tend to be interested in that subject as taught both in the elementary school and in the high school. Accordingly, each of the first three chapters deals with selected aspects of the teaching of science, without any attempt to divide the discussion in ways which correspond to typical administrative divisions of schools.

Most workers in the field of the teaching of mathematics, however, confine their interest either to the teaching of arithmetic in the elementary school or to the teaching of high-school mathematics. In accordance with the prevalence of these interests, it seemed best to divide the last three chapters along these lines. Parenthetically, it may be noted that the mathematics program in schools tends to be an eight-four program, regardless of the manner in which the school system is organized administratively. Administratively, and perhaps pedagogically, the mathematics program in what are usually considered the junior high-school grades, is pretty chaotic. But in any case, research concerned with the program in Grades VII and VIII is incorporated in the chapter on arithmetic, while that concerned with the teaching of algebra or general mathematics in the ninth grade is referred to in the chapter on high-school mathematics.

No effort will be made here to discern trends, or to compare or contrast the research reported here with that reported in previous issues of the Review. Mention should be made, however, of one significant development. About 16 years ago workers in the field of arithmetic teaching were given a new phrase, "the meaning theory." Like many another but less worthy bit of pedagogical phraseology, it achieved considerable currency. Gradually it became apparent that here was a concept of great significance, which held high promise of making an important contribution to the teaching of the subject. It is gratifying to note that the present report indicates that research workers are attacking vigorously the problems of refining the theory, particularizing it, and using it to bring new insights to teachers and children.

Harry E. Benz, *Chairman*
Committee on Natural Sciences and Mathematics

CHAPTER I

The Science Curriculum

ELSA MARIE MEDER

IN REVIEWING the literature of the past three years dealing with curriculum research in science, certain general impressions are gained which are encouraging and even inspiring. They are these: (a) The areas of most activity are those with the longest tradition. For example, science was taught in the colleges before it found its way into high schools, elementary schools, and early childhood education; yet there appears to be currently more rethinking of the function of science in general education at the college level than at any precollege level. (b) There is recognition that education is primarily a matter of learning rather than of teaching: at all levels instructors are participating with their students in the adventure of learning, and thus demonstrating that learning is exciting. (c) There is a pervasive concern with human values: if science education is good, it is good in terms of its effects on the learners. Consequently, there is a willingness to reexamine the content of courses in terms of its value for students. (d) There is little evidence of a tendency to exalt science unduly; rather there are indications of a healthy humility, a willingness to face the failures of science as well as to glorify its successes, and a recognition of the partnership in scientific research of creative imagination and the step-by-step process of verification.

Aims of Science Instruction

The objectives of science teaching have frequently been grouped in four categories, as was done recently by Anderson (2): attainment of factual information; understanding of broad principles of science and their application to specific situations; understanding and use of the scientific method; and acquisition of scientific attitudes. Emphasis on facts for the sake of factual knowledge has been steadily declining in general education courses at all levels; emphasis on objectives in the other three categories has been as steadily increasing. A fifth category, development of a philosophy of living in accord with the extent and nature of scientific knowledge (which has been included in statements of objectives in the past), has received less attention in recent research reports of workers in science education, despite the growing general concern for moral and spiritual values in American education.

During the three-year period under review, there has been a decrease in the number of research studies directed toward the identification of principles important in the various science subjectmatter areas, perhaps because of the quantity and quality of earlier work toward this end (cited in the October issues of the REVIEW OF EDUCATIONAL RESEARCH in 1945 and 1948). Some of this hitherto unpublished work has recently become generally available (31, 34). Research on the identification of science principles for use in elementary education has been reported as in progress (47).

Meanwhile, there has been a noticeable increase in the number of publications concerned with the development of understanding of scientific method and concomitantly of scientific attitudes. Most of these have been discussions rather than reports of research. The very acceptance of "scientific method" as an aim susceptible to definition and attack has been questioned and, of course, defended, as in an interchange between Kruglak (24) and Blake (5). Rogers (51) pointed out that this aim is dual in nature, involving both training in scientific investigation and showing what science is like. The latter he deemed one of the most important goals of science in general education, and one which may afford an opportunity for encouraging habits of critical thinking and their transfer to nonscience activities.

According to George (17), it is necessary to recognize that all standard treatments of the nature of scientific method in all languages are based on philosophy, and that most of them are written by persons who have done no scientific research. Nagel (38) attempted to clarify the concept of scientific method of analyzing its content and value; he held that scientific method is the subjectmatter of the logic of inquiry and that it can be explored profitably only in conjunction with the concrete materials of the sciences. Friedenberg (16) reported the definition by the staff of the college general biological sciences course in the University of Chicago of a major objective which had not previously been defined as such: the development of insight into the underlying structure of the biological sciences. Attainment of such insight would be evidenced by ability to distinguish structural artifacts from basic data and would be of value in helping students relate biological information to other aspects of their experience. A committee of the National Association for Research in Science Teaching has been attempting to identify and describe aspects of problem-solving ability; two reports of its deliberations have been published (41, 42).

Research pertinent to discussions of scientific method was carried out by Lampkin (26), who prepared a detailed formulation of the scientific method of inquiry, primarily from a study of philosophical works. In a carefully controlled investigation, he found that competent judges, whether trained as science teachers or in philosophy, were unable to agree on what aspect of scientific inquiry was being described in various passages of science textbooks, or even whether or not there was any consideration at all of scientific inquiry. (See Chapter II.)

The Search for Valid Bases of Objectives

In a recently published summary and interpretation of the long-term experiment of the Bureau of Education Research in Science, previously reported only in part, Laton and Powers (27) described ways in which objectives have been sought and found by secondary-school teachers in studies of the communities in which they teach, of the young people with whom they deal, and of the problems which adults face in contemporary life. In a progess report of an extensive experimental general-education project in Battle Creek, Michigan, Evans and others (14) described how a cooperative research committee of high-school teachers and consultants developed objectives concerned with problem-solving, values and value patterns, and understandings, attitudes, and skills basic to effective personal living and group participation.

While agreeing that objectives may legitimately be sought in study of the young people being taught, Nedelsky (43) maintained that in higher education, at least, the objectives of a course should be stated explicitly and in detail in terms of what the students should be like after completing the course. One method of arriving at such objectives is to state the most general objective first, even if it seems platitudinous; then, after clarifying it, to identify particular contributions the course should make toward that general objective. A second method is to start with the particular content of the subject and identify the generalized abilities to which it can contribute. Nedelsky stated that both methods should be used in formulating objectives. He pointed out that in most courses the content dimension is perfectly clear to the instructor, but that it is not clear what the student completing the course should be able to do with the content; hence objectives should be stated in terms of behavior. He proposed five criteria for objectives: communicability, importance, teachability, testability, and comprehensiveness.

The Science Curriculum in Elementary Schools

The curriculum in science at all levels is being adapted to the changing aims of instruction. Craig (11) pointed out that the rethinking of the purposes of science in childhood education is bringing about a realization that science in the elementary school must be apropriate to children—their ideas of themselves and of their world; their interest in discovering facts for their own purposes; their natural applications of critical thinking, however fragmentary these seem to adults; their development and growth in resourceful and intelligent behavior. Such science is not the content of high-school biology, chemistry, and physics brought down to an elementary-school level, nor is it the rigid application of sequential steps in the scientific problem-solving method as reported by laboratory research workers; rather it is the exploration of events in the environment and the development of explanations to them, and as such it utilizes the natural drives of children. But only a beginning has been made in this respect. Lammers (25) found that, while 74 of 100 elementary-school teachers interviewed said they were free to utilize science materials as they chose, 50 of the 100 relied solely on correlative and incidental learnings for instruction in science. The primary need of these 100 teachers was identified as the development of insights concerning the purpose and place of science in elementary education: 33 teachers believed its aim to be interpretation of the environment, while to 23 it was the satisfying of curiosity; only 17 seemed to have any perception of its importance in the development of behavior patterns. In reporting the progress of an extensive program of integrated research in the problems of teaching science and health in elementary school, Otto (47) stated that most courses of study in elementary science and health had been found to be conglomerate in nature and to give little evidence of conscious or thoughtful consideration of objectives. He suggested that, if a sound curriculum in science is to be developed for the first six grades, four approaches to the formulation of objectives must be harmonized: the nature-study approach; an approach from the general purposes of education; consideration and analysis of the principles of science; and study of the common activities or areas of living. He indicated that efforts to achieve such harmonization were being made.

The Status of the Secondary-School Science Curriculum

A study of science teaching in Grades VII thru XII was made during the first half of the school year 1947-48 under the auspices of the United States Office of Education and reported by Johnson (22). Data concerning science offerings and enrolments were obtained from a stratified random sample consisting of 715 of the approximately 24,000 public high schools in the United States. In Grades VII and VIII, general science was almost the only science offering; in Grade IX, it was the standard course, altho it was sometimes alternated and sometimes replaced with biology. Sixty-two percent of the pupils in the seventh grade, 78 percent of the eighth-graders, and 66 percent of the ninth-graders were enrolled in general science; 75 percent of all Grade X pupils were enrolled in biology. In other words, more than two-thirds of the children in these four grades were receiving instruction in science. The picture was different for Grades XI and XII, where the standard offerings were chemistry and physics, respectively. About 20 percent of all students in Grades XI and XII were taking chemistry; about 13 percent of them were taking physics.

In this connection Johnson presented a tabulation of the percent of pupils in the last four high-school grades who were enrolled in science courses in various years in which statistics were collected. The percent in ninth-grade general science was found not to have changed materially since 1922, the first year for which data were available, hovering around 18 percent. The percent enrolled in biology rose steadily from about 7 percent in 1915 when it was first reported to the 20 percent found in the 1947 survey. The percent of pupils in chemistry remained remarkably constant; it was 10 percent in 1890 and almost 9 percent in 1947, having fluctuated between the 1890 high point and lows of about 7 percent in 1905 and 1928. The high point of physics enrolment was 1895, when almost 23 percent of the young people in high school studied physics.

Since then, the decline has been continuous; the percent enrolment was 5.5 in 1947.

In close agreement with the findings of the Office of Education study were results reported by Sanford (52) of a survey of science enrolments in Illinois high schools, made as part of the Illinois Secondary School Curriculum Program. In 1947-48, the enrolments in general science, biology, chemistry, and physics were, respectively, 19 percent, 19 percent, 7 percent, and 6 percent of the Illinois high-school population. The similarity of the results of the Illinois survey to the data obtained by the Office of Education in the same year adds interest to another aspect of the Illinois inquiry—the science preparation of students entering the University of Illinois as freshmen in September 1948. Of these students, 80 percent had had general science, 63 percent biology, 62 percent chemistry, and 70 percent physics. Evidently the study of chemistry and physics in Illinois high schools was virtually limited to college-bound youth. A study made at San Francisco State College in 1947, while dealing with a population not strictly comparable to that at the University of Illinois, nevertheless is similarly suggestive. Morse (37) reported a survey of the high-school science courses taken by 506 students enrolled in non-science curriculums at the college. Chemistry led the list, 57 percent having had a high-school course; biology, general science, and physics followed in that order, having been studied by 45 percent, 38 percent, and 29 percent of the group surveyed.

Changes in the Secondary-School Science Curriculum

Not much evidence of a changing curriculum in high-school science emerged from that data collected and presented in the Office of Education report (22). However, a total of 135 of the 715 schools in the sample reported one or more science offerings in addition to standard courses in general science, biology, chemistry, and physics. Most frequently reported were "applied" courses, such as applied physics; next in order of frequency was physiology; then came courses in "related science." Also reported were offerings in physical science, earth science, plant science, and five other subjects. Johnson found that all courses offered in addition to the four standard courses could be classified in three groups: physical science, "broad science," and biological science. Of these, physical science was offered in the greatest number of schools—61 in all; 49 had "broad science" courses; and 25 had additional courses in biological science.

As a status study, the Office of Education survey was not geared to the discovery of foci of change; it could hardly be expected to reveal promising innovations in individual school systems. In another report, however, Johnson (21) indicated that he could identify an increase in the number of general courses in high-school science, and also a growth of the two-track system of parallel science courses. A two-track system in the sciences in the senior high school has been discussed by the Cooperative

Committee on the Teaching of Science and Mathematics (30): one track, for students whose interests suggest careers in science, would be the three-year sequence of biology, chemistry, and physics; the other track, for students who will be "educated laymen," would be a two-year sequence of biological and physical science. This Committee has not recommended the double-track curriculum, but it has recommended that two years of science be required of all pupils in the senior high school (1).

Studies carried out as a part of the Illinois Secondary School Curriculum Program led Burnett and Sanford (9) to point out that the contributions of science teaching to an individual's life must at present be made no later than in Grades IX and X. Accordingly, various Illinois schools have undertaken modifications in their science curriculums. These range from experimental modifications of standard courses in chemistry and physics to core programs that pay no attention to subjectmatter boundaries. Grant (18) reported that a required course in health science has replaced ninth-grade general science in a four-year high school with 3000 pupil population; she did not state what provision was being made for including in the pupils' programs the principles of physical science ordinarily developed as part of ninth-grade general science. Lowry (29) reported that, in a four-year school with an enrolment of 1000, biology was shifted from Grade X to Grade IX, replacing general science; and a physical science course was introduced in Grade X. He implied that all students would study biology under this plan, but did not indicate whether the physical science course is required or elective.

Laton and Powers (27) were able to classify the curriculum changes in the schools with which they worked as of three kinds: the introduction of new interdepartmental courses, almost all of them centered in a study of the community; the development of new science courses; and changes in emphases within existing courses. They had no doubt as to the basic cause of these curriculum changes: the teachers themselves had changed as a result of their own study of communities, adolescents, and the persistent problems of people in the present world. Klohr (23) investigated the effect on curriculum change of the resource unit, which may be described as suggestions for teaching about some broad area of experience, so organized as to serve as a source of ideas, material, and procedures for teachers planning their work. Resource units were found to be effective agents of curriculum reorganization where used, but their use was not widespread.

The Nature of High-School Science Courses

After studying the biology and chemistry courses given during the school year 1946-47 in a representative sampling of Minnesota high schools, Anderson (2) concluded that these courses were "far from ideal." Two of the shortcomings he identified were the absence of differentiation among curriculum materials for groups of varying interests and abilities, and the failure to direct instruction toward the development of understanding of principles and acquisition of scientific attitudes.

No other studies similar in scope to Anderson's have been reported recently, and it may well be that conditions in general are as far from the ideal in other states as in Minnesota. However, there have been reports of promising practices in various school systems. Miller and Dresden (35) described the use of current materials in chemistry classes; the purpose, to develop increased understanding of principles, was apparently realized. Mohler (36) reported the introduction of an experimental unit on mental hygiene in a high-school biology course; the unit was built around responses to two sets of questionnaires relating to the psychological problems of adolescents. Subarsky (55) described an experiment in a New York high school, in which material on race and culture was taught in connection with biology. That the inclusion of such material was indeed an innovation is clear from the report of a survey by Nagler (39) of biology courses in academic high schools in that city: he found that fewer than 10 percent of these schools included a unit on anthropology in the biology course, that the average time devoted to the unit where taught was four days, and that less than half the unit was concerned with the study of race and racism. In schools cooperating with Laton and Powers (27), the most common change in biology courses was the inclusion of material on human growth and development, either as an integrating theme for a long period of study or as short units of work. Another modification in these schools was stress on the interrelation of plants and animals, often as a new approach to the study of conservation.

While biology appears to be the high-school science course which is most frequently modified, evidence suggests that physical science is the course being introduced most often in high schools. Descriptions of such innovations were given by Laton and Powers (27), Griffiths (19), and Updike (56); other courses were reported in a recent symposium on practices and problems in teaching modified courses in the physical sciences (44). In the latter account, certain conclusions and inferences were stated, as follows: (a) efforts at modification have taken the form of classroom experimentation rather than of controlled research; (b) attempts at evaluation of results have not been objective nor statistical, and their validity and the conclusions drawn from them are suspect; (c) while there was general agreement that courses in the physical sciences should be integrated with respect to a basic theme, there was no evidence of an emerging pattern of integration; (d) the roles of textbook, laboratory work, and field trips in the teaching of physical science have not yet been clarified.

A few other "new" courses have been described. McGrath (33) considered geology of exceptional value, especially as a laboratory science in a core curriculum. Feifer (15) reported the introduction of a course in the history and development of science, offered as the fourth year of science in a specialized high school (the Bronx High School of Science).

The course was built around major concepts, such as changes in man's conception of the universe, the evolution of modern theories of matter and energy, and the growth of ideas concerning the causes of disease.

Science for General Education in Colleges

College science courses designed for general education have been of increasing importance in recent years. Their number and nature were investigated by Bullington (7) in a study made under the auspices of the Cooperative Committee on the Teaching of Science and Mathematics. This study showed that in 1948 over half the four-year colleges in the United States offered general-education science courses, most frequently as a program consisting of companion courses in the physical and biological sciences. In a follow-up of a 1938 study of generalized science courses in four-year state teachers colleges, Reynolds (50) found an increase of 60 percent in average enrolment, without a corresponding increase in the size of the student body.

Bullington (7) analyzed 150 general-education science courses, distributed among 83 liberal arts colleges and 23 teachers colleges. He reported the most common types of teaching approach to be, in order of prevalence, the subjectmatter survey, in 42 courses; the study of selected units, in 31 courses; the study of selected problems, in 20 courses; and the historical approach, in 11 courses. A combination of these procedures was used in 30 courses.

Of the four types of approach which Bullington identified, three may be grouped as "block-and-gap" methods; that is, concentration on selected material while consciously omitting other material which may be of equal worth. It is evident that in the majority of the colleges considered in Bullington's study, the general-education science courses were selective rather than comprehensive in character. To the objection that any block-and-gap approach is inadequate, Conant (10) replied that a choice must always be made as to what to teach, since it is impossible in any event to cover all the available or even all the desirable material in an area. Rogers (51) pointed out that an essential of an effective block-and-gap course is careful and adequate treatment of the blocks, and that another essential is connection of the blocks: discussions and investigations, historical studies, ideas and information carried from one block to another, all of which help to show the organic structure of science. Without such interconnection a block-and-gap course may become an emaciated survey course—an unsatisfactory "smörgåsbord."

Hatch and Cope (20) described the development according to Rogers' scheme of a physics course built around the study of the atom; their report dealt in some detail with a method of making the transitions from block to block. Blisard (6) used the problem of housing as the central block in an experimental physical science course, turning to the block-and-gap procedure because a survey course had been found ineffective with respect to such objectives as growth in the ability to identify problems and to plan and carry out investigations. Test results showed not only that broad objectives were achieved more effectively by the block-and-gap course than by the survey course it replaced, but also that the range and depth of subjectmatter learning in the physical sciences was greater than it had previously been. Perlman (48) reported a course consisting of a series of units, each of which comprised an integration of the various sciences about a central interest vital in students' everyday life, as, for example, an integrated unit dealing with the human body.

The historical approach to the teaching of science has been most intensively developed under Conant's leadership. In a progress report on a general education course in the physical sciences, Conant (10) stated as a basic assumption the premise that study of the way in which certain scientific ideas have been developed will lead to an understanding of the processes by which the experimental sciences have advanced and are advancing. Because the stress in the course is on methods, material from various fields of science is considered; because understanding of processes is possible only in terms of mastery of content, the physical and chemical principles underlying the development of ideas are presented. To keep the factual content relatively low, so that comprehension of generalizations rather than memorization of facts may be fostered, examples are chosen from the history of science (for example, from the 17th Century) instead of from modern developments. Experiences with the case-study method have indicated that there is no inconsistency between this approach and a treatment of scientific topics in a continuous pattern which enables the student to recognize that science is both a historical growth and an exploration of natural phenomena. In a recent discussion of the work at Harvard, Nash (40) pointed out that the case-study approach calls attention to the factors that delay as well as to the factors that promote the progress of science, an important awareness on the part of laymen in the modern world.

Among the criticisms of Conant's course is one to the effect that the approach does not adequately capitalize "the potentialities inherent in a freshman's desire to explore those problems that lie at the interface between epistemology or metaphysics on the one hand and physical science on the other" (10). With this criticism in mind, Van Deventer (57) included as a major goal of a general biology course an understanding of the relation of science and science-generated ideas to the world-view of modern man. In reporting his experiences with this course, he stated that while historical material was not its core, such material was used freely and profitably when necessary for the clarification of a problem under consideration.

Testing To Measure Achievement of Aims

The use of objective tests is no longer limited to measuring the acquisition of information. Woodburn (59) reported modifications and adaptations of objective-type items to test for ability to apply principles, recognize relationships, translate observations into generalizations, and evaluate generalizations. Levy (28) described the chemistry tests of the Educational Test Service with special reference to testing application of knowledge in various situations. Friedenberg (16) discussed the preparation of a battery of test items designed to measure understanding of the basic nature of biological science. The test items were found to be discriminatory both for students who had taken a college course with such understanding as a stated goal and for those who had not, and to measure increase in understanding as a result of taking the course. However, they did not measure subsidiary skills such as the ability to detect meaningless statements and the ability to identify definitions not in classic form.

Considerable attention has been given to the problem of measuring the ability to think critically. Burke (8) analyzed certain items which have been used in an effort to measure this ability, and concluded that many of them actually measured knowledge of subjectmatter. He pointed out the desirability of presenting the necessary facts as a part of any item intended to measure critical thinking. Noyce (46) described a kind of objective test in organic chemistry which has been found effective in requiring students to think critically with the information they possess, and suggested adaptations for use in high-school chemistry courses. Verduin (58) advocated the use of open-book tests, in which students are required to respond to objective items; for example, to determine whether the data in a certain table support a given conclusion. Acting on Verduin's suggestion, Smith (53) prepared such a test for use in high-school biology classes; no reports of its use have yet appeared. Read (49) analyzed statements generally accepted as descriptive of scientific method, and concluded that all involve certain discriminatory choices. He then built a series of nonverbal tests around these choices; each test posed a problem to be solved by the classification of photographs.

Edwards (13) reported the construction of two tests designed to measure the ability of high-school students to think critically with the facts of science. One test consisted of matching principles with descriptions of phenomena, and was found to be sufficiently reliable for use with individuals. The other consisted of items calling for judgments as to which of two opinions was better in the light of given statements to be assumed true; this test was found sufficiently reliable for group use. Both tests appeared valid to the extent that they did not measure either intelligence or school achievement. They were administered in preliminary form to 200 students in Grades IX thru XIV and in final form to 1000 students in Grades X, XI and XII. In both forms the range in any one grade completely overshadowed any increase in mean score from grade to grade.

Dunning (12) developed a "test of scientific thinking" in two parts: one concerned with the ability to interpret data, the other dealing with the ability to apply principles. The test was administered to 109 freshmen in a college physics course, each of whom was also rated independently by two laboratory instructors on his ability to interpret data and apply principles in actual laboratory situations. These ratings correlated with the scores on the test to the extent of .7. The scores on the test were also compared with scores on the Strong Vocational Interest Blank, using the scientific interest key, and with scores on a test of general reading ability, on Thurstone's primary Mental Abilities Test, and on a fact test. Correlations were low in all cases. The correlation between the two parts of the scientific-thinking test was also low, thus affording justification for separate appraisal of the specified abilities.

If scientific method is operative in the thinking of students, it may be expected to result in changes of opinion when pertinent new knowledge is acquired. Accordingly, Solomon and Braunschneider (54) surveyed the racial, religious, and national prejudices of students in a college basic biology course, using a social-distance scale. The expressed attitudes of a control group of 1091 students were compared with those of an experimental group of 1334 students. The experimental group had studied the biology of the races of man presented with the intent of applying the scientific method to the problem of prejudices in this area. The data indicated that the teaching resulted in lessened prejudice; however, the investigators recognized that they had not measured the "staying quality" of the change, nor had they measured its expression in overt behavior. Barkley (4) studied the responses of freshmen college women to the Thurstone attitude-toward-evolution scale, administered as a pretest and as a post-test to five groups: students in biology classes, students in chemistry classes, those taking both biology and chemistry, those enrolled in mathematics but not in a science, and students in a commercial curriculum including neither science nor mathematics. The first three groups changed from a prevailing attitude of neutrality or doubt to an attitude favorable to the acceptance of evolution; the change in the mathematics group, altho in the same direction and from the same position, was not significant. There was no change in the commercial group, which differed from the others also in showing an initial attitude of antagonism toward evolution. No significant difference was found between students who had had biology in high school and students who had not.

Studies by Anderson (2, 3) sought to identify factors involving achievement in biology and chemistry. These studies are reviewed in detail in Chapter II.

Mason (32) used a test of information to analyze the needs of students in a college biological science course. When the test was given during the early part of the course, he found that the various areas of subject-matter could be ranked with respect to student knowledge in this order: interrelationships of living things; economic biology; evolution; coordination and adjustment, and reproduction; and parasitism. When he compared the pretest scores with scores achieved on the same test during the closing week of the course, he found that the greatest gains in information had taken place in the area of reproduction; the other areas could be arranged with respect to increase in student knowledge in this order: heredity, evolution, coordination and adjustment, parasitism, economic biology, and interrelationships.

Noll (45) reported a study of the measurement practices and preferences of 390 high-school science teachers, made as a part of a nationwide survey of 2303 high-school teachers in 207 schools. He found that the science teachers commonly used both essay tests and objective tests: only 1 percent used no objective tests and only 13 percent used no essay tests. In their objective tests they incorporated many types of items; they favored completion, short-answer, and multiple-choice items over matching and true-false items. They depended to some extent on other evaluation instruments than tests: 48 percent used cumulative pupil records, and 44 percent used rating scales. But these teachers revealed a lack of information about standardized subjectmatter tests and a disinclination to administer them. Altho only about 36 percent of the teachers said that they never used standardized tests, Noll found a strong indication that the others used these tests only incidentally in evaluating student achievement. In their use of standardized tests, science teachers were found to be somewhat behind teachers of other subjects; on the whole, however, their measurement practices compared favorably with those of their colleagues in other areas.

Bibliography

1. American Association for the Advancement of Science, Cooperative Committee on the Teaching of Science and Mathematics. *You Too Can Help the Science Teacher! A Summary of Recommendations and Their Possible Realizations.* West Lafayette, Ind.: Purdue University, 1950. 3 p. (Mimeo.)
2. Anderson, Kenneth E. *The Relative Achievement of the Objectives of Secondary School Science in a Representative Sampling of Fifty-Six Minnesota Schools.* Doctor's thesis. Minneapolis: University of Minnesota, 1949. 288 p. (Typewritten) Reported as "Summary of the Relative Achievements of the Objectives of Secondary School Science in a Representative Sampling of Fifty-Six Minnesota Schools." *Science Education* 33: 323-29; December 1949. Also as "A Frontal Attack on the Basic Problem in Evaluation: The Achievement of the Objectives of Instruction in Specific Areas." *Journal of Experimental Education* 18: 163-74; March 1950.
3. Anderson, Kenneth E. "A Study of Achievement in High School Chemistry in Several Eastern and Midwestern States." *Science Education* 34: 168-76; April 1950.
4. Barkley, Key L. "The Influence of College Science Courses on the Development of Attitude Toward Evolution." *Journal of Applied Psychology* 32: 200-208; April 1948.
5. Blake, Lamont V. "The Delusion of the Scientific Method." *American Journal of Physics* 17: 451; October 1949.
6. Blisard, Thomas J. "Developing Physical Science Experiences at Madison College with Special Reference to Housing." Ed. D. project report. New York: Teachers College, Columbia University, 1948. 155 p. (Typewritten) Reported in *Teachers College Record* 51: 173-74; December 1949. Also as "Developing Physical Science Experiences Thru the Use of Cooperative Group Process." *Science Education* 33: 366-71; December 1949.
7. Bullington, Robert A. *A Survey of the Present Status of Science Teaching in General Education in the Colleges and Universities of the Country.* Doctor's thesis. Evanston: Northwestern University, 1949. (Typewritten) Reported as

"Summary of a Study of College Science Courses Designed for General Education." *Association of American Colleges Bulletin* 36: 267-72; May 1950. Also as "A Study of Science for General Education at the College Level." *Science Education* 33: 235-41; April 1949.

8. Burke, Paul J. "Testing for Critical Thinking in Physics." *American Journal of Physics* 17: 527-32; December 1949.
9. Burnett, R. Will, and Sanford, Charles W. "The Research Program of the Illinois Secondary School Curriculum Program." *Science Education* 35: 65-69; March 1951.
10. Conant, James B. *The Growth of the Experimental Sciences.* Cambridge: Harvard University Press, 1949, 67 p.
11. Craig, Gerald S. "Unfinished Business in Elementary Science." *Teachers College Record* 50: 410-16; March 1949.
12. Dunning, Gordon M. "The Construction and Validation of a Test To Measure Certain Aspects of Scientific Thinking in the Area of First Year College Physics." *Science Education* 33: 221-35; April 1949.
13. Edwards, T. Bentley. "The Measurement of Some Aspects of Critical Thinking." *Journal of Experimental Education* 18: 263-78; March 1950.
14. Evans, Hubert M., and others. "Cooperative Research and Curriculum Improvement: Progress Report of an Experimental General Education Project, Battle Creek, Michigan, Schools and the Horace Mann-Lincoln Institute of School Experimentation." *Teachers College Record* 51: 407-74; April 1950.
15. Feifer, Nathan. "Course in the History and Development of Science." *High Points* 31: 5-13; February 1949.
16. Friedenberg, Edgar Z. "The Measurement of Student Insight into the Structure Underlying the Organization and Viewpoint of the Biological Sciences." *Science Education* 33: 57-64; February 1949.
17. George, William H. "The Physicist and the Scientific Method." *American Journal of Physics* 17: 201-203; April 1949.
18. Grant, Charlotte L. "Meeting Student Needs by Integration." *School Science and Mathematics* 51: 193-98; March 1951.
19. Griffiths, Daniel E. "An Experiment in Science for the General Student." *School Science and Mathematics* 50: 515-19; October 1950.
20. Hatch, Albert J., and Cope, David F. "Flashback Teaching Technique Applied to a Block-and-Gap Physics Course." *American Journal of Physics* 19: 137-45; March 1951.
21. Johnson, Philip G. "Some Developments in Science Teaching and Testing." *School Science and Mathematics* 50: 187-99; March 1950.
22. Johnson, Philip G. *The Teaching of Science in Public High Schools, An Inquiry into Offerings, Enrollments, and Selected Teaching Conditions, 1947-1948.* U. S. Office of Education, Bulletin 1950, No. 9. Washington, D. C.: Government Printing Office, 1950. 48 p.
23. Klohr, Paul Robert. "A Study of the Role of the Resource Unit in the Curriculum Reorganization of Selected Secondary Schools." *Abstracts of Doctoral Dissertations*, No. 57, 1947-48. Columbus: Ohio State University, 1949. p. 111-60.
24. Kruglak, Haym. "The Delusion of the Scientific Method." *American Journal of Physics* 17: 23-29; January 1949.
25. Lammers, Theresa J. "Some Suggestions for the Improvement of Science Education in the Elementary Schools of Massachusetts." Ed. D. project report. New York: Teachers College, Columbia University, 1948. 173 p. (Typewritten) Reported in *Teachers College Record* 50: 550-51; May 1949. Also as "One Hundred Interviews with Elementary School Teachers Concerning Science Education." *Science Education* 33: 292-95; October 1949.
26. Lampkin, Richard H. *Variability in Recognizing Scientific Inquiry.* Teachers College Contributions to Education, No. 955. New York: Teachers College, Columbia University, 1949. 79 p.
27. Laton, Anita D., and Powers, S. Ralph. *New Directions in Science Teaching.* New York: McGraw-Hill Book Co., 1949. 164 p.
28. Levy, Beatrice. "Testing the Outcomes of Chemical Education." *Journal of Chemical Education* 28: 43-46; January 1951.
29. Lowry, Nelson L. "Biology and Physical Science for Ninth- and Tenth-Grade Students." *Science Education* 35: 71-73; March 1951.

30. Mallinson, George G. "A Report to the National Association for Research in Science Teaching on the Activities for 1949-1950 of the Cooperative Committee on the Teaching of Science and Mathematics of the American Association for the Advancement of Science." *Science Education* 34: 177-80; April 1950.

31. Mallinson, George G. "Materials of Consumer Science for the Junior High School." *Science Education* 33: 20-23, February 1949; 138-46, March 1949.

32. Mason, J. M. "A Pre-Test and Post-Test Study in Biological Science." *Journal of Educational Research* 42: 228-33; November 1948.

33. McGrath, G. D. "Have You Considered Geology—An Ideal Subject for Curriculum Enrichment?" *Science Education* 33: 51-55; February 1949.

34. Miles, Vaden W. *Principles and Experiments for Courses of Integrated Physical Science.* Ann Arbor: Edwards Brothers, 1950. 430 p. (Lithographed)

35. Miller, Miles M., and Dresden, Katharine. "Current Approaches in the Teaching of Science." *School Science and Mathematics* 49: 359-65; May 1949.

36. Mohler, Charles W. "High School Biology and Mental Hygiene." *School Science and Mathematics* 50: 713-24; December 1950.

37. Morse, Stanley W. "High School Science Experiences of 506 Non-Science Curricula College Students." *Science Education* 34: 117-26; March 1950.

38. Nagel, Ernest. "The Methods of Science." *Scientific Monthly* 70: 19-23; January 1950.

39. Nagler, Harold. "The Place of Anthropology in the Biology Course." *American Biology Teacher* 12: 65-67; March 1950.

40. Nash, Leonard K. "An Historical Approach to the Teaching of Science." *Journal of Chemical Education* 28: 146-51; March 1951.

41. National Association for Research in Science Teaching, Committee on Research in Secondary-School Science. "Problem-Solving as an Objective of Science Teaching." *Science Education* 33: 192-95; April 1949.

42. National Association for Research in Science Teaching, Committee on Research in Secondary-School Science. "Problems Related to the Teaching of Problem-Solving That Need To Be Investigated." *Science Education* 34: 180-84; April 1950.

43. Nedelsky, Leo. "Formulation of Objectives of Teaching in the Physical Sciences." *American Journal of Physics* 17: 345-54; September 1949.

44. Nelson, O. A., and others. "Physical Science Today." *Science Teacher* 18: 13-21; February 1951.

45. Noll, Victor H. "Measurement Practices and Preferences of High School Teachers." *Science Education* 34: 165-67; April 1950.

46. Noyce, William K. "An Objective Type of Organic Chemistry Test and a Study of Its Validity." *Science Education* 34: 110-16; March 1950.

47. Otto, Henry J. "Curriculum Studies in Elementary-School Science." *Growing Points in Educational Research.* Official Report of 1949 Meeting. Washington, D. C.: American Educational Research Association, a department of the National Education Association, 1949. p. 142-46.

48. Perlman, James S. "Integration in College Courses in Science for General Education." *Science Education* 35: 122-33; March 1951.

49. Read, John G. "A Non-Verbal Test of the Ability To Use the Scientific Method as a Pattern for Thinking." *Science Education* 33: 361-66; December 1949.

50. Reynolds, Charles W. "Trends and Present Status of Generalized Science in State Teachers Colleges." *Science Education* 34: 77-80; March 1950.

51. Rogers, Eric M. "Block-and-Gap Scheme for Physics Courses." *American Journal of Physics* 17: 532-41; December 1949.

52. Sanford, Charles W. "High School Science and Mathematics—For Whom and for What?" *School Science and Mathematics* 50: 307-19; April 1950.

53. Smith, Ella Thea. "Open-Book Tests in Biology." *Metropolitan Detroit Science Review* 10: 28-29; May 1950.

54. Solomon, Marvin D., and Braunschneider, G. Edward. "Relation of Biological Science to the Social Attitudes." *Science Education* 34: 80-84; March 1950.

55. Subarsky, Zachariah. "Human Relations in Our Time." *Science Education* 32: 138-42; April 1948.

56. Updike, Glenn H. "Development of a Course in Physical Science." *School Science and Mathematics* 51: 141-47; February 1951.

57. VAN DEVENTER, WILLIAM C. "Teaching Science in Relation to Man's Thinking." *Science Education* 35: 104-106; March 1951.
58. VERDUIN, JACOB. "An Open-Book Objective Examination for Science Courses." *School Science and Mathematics* 50: 213-21; March 1950.
59. WOODBURN, JOHN. "Constructing Machine Scorable Examinations in the Natural Sciences." *Science Teacher* 17: 213-17; December 1950.

CHAPTER II

Instructional Procedures in Science

R. WILL BURNETT and THEODORE POROWSKI

In view of the extensive and thoro work being done by the National Association for Research in Science Teaching in the collation of unpublished research—which data will be made available to workers in the field in the form of reports—the authors of the present chapter made no attempt to secure unpublished studies for review. The review presented is based upon a study of well over 400 published studies which, by titles, appeared to merit consideration for inclusion. Only those are here included in which some measure of empirical data is reported in terms of reasonable validity. Only three reports which might be labeled as descriptive are included in the present chapter. These are included because they provide insights into new fields or because they form a basis for the possible launching of empirical studies.

The studies reported in this chapter vary considerably in the soundness of their conception and in their execution. It should be stressed that the careful use of sound research design will more surely chart the way to more effective instruction in science than will the accumulation of hundreds of partially valid studies. Some of the research here reported is of excellent caliber. The first study reported below is a good example of a carefully conceived and comprehensive study that utilized newer statistical technics and that produced at least presumptive data of significance. It is to be hoped that more of this caliber will be forthcoming.

Classroom Technics and Other Factors Related to Student Achievement

Anderson (2) sent a one-page questionnaire to teachers in 21 communities in 12 states who had previously participated in trying out the experimental forms of the author's new chemistry examination. Usable replies were secured from 17 teachers in eight midwestern and eastern states. No claim is made by the author for the representativeness of the sample. Anderson attempted to determine what factors reported in the questionnaires affected achievement in the 17 classes. Variance and co-variance statistical technics were used. Differences in intelligence of the students were equated out. The author found that the students achieved significantly more in chemistry when: (a) they were enrolled in large schools; (b) the teacher's load was in the lowest quarter of the distribution; (c) the teacher was in the upper quarter of the distribution in terms of college hours of chemistry taken; (d) the same for total college credit in sciences; (e) class size was in the lower quarter of the distribution; (f) students used a laboratory manual; (g) students received laboratory work rather than demonstrations alone; (h) students had two double laboratory periods a week rather than five periods a week for both laboratory and class work; (i) students used a macro- rather than a semimicro-approach. A total of 15 such comparisons were made. In reference to points (c) and (d) above it should be noted that the lowest quartile and highest quartile for semester hours of chemistry taken in college were 10.5 hours and 31.5 hours and the same for total science courses taken were 52.5 hours and 84.3 hours respectively. Thus the highest quartile represented a not excessive preparation in chemistry in terms of a total college program and in terms of the balance with other science courses. The lowest quartile represented approximately the beginning year of college chemistry only.

In a study previous to that reported above, Anderson (3) secured comprehensive data on a representative sampling of 56 Minnesota high schools. His study provided a description of practices in the teaching of biology and chemistry and a description of teachers of these subjects in terms of their backgrounds of preparation and experience. In one phase of this exceptionally well designed and executed study Anderson secured responses from some 91 teachers of biology and of chemistry to some 58 items. Anderson found that the median number of quarter hours of preparation in college biology of the biology teachers was 27 while the median number of quarter hours in chemistry of the chemistry teachers was 23. Fifty-five percent of the biology teachers and 91 percent of the chemistry teachers followed a workbook or laboratory manual. Laboratory work accompanied classwork in 65 percent of the cases in biology and in 51 percent of the cases in chemistry. Only 5 percent of the biology teachers and 13 percent of the chemistry teachers provided laboratory instruction preceding the equivalent classwork. A variety of laboratory procedures were used but most teachers in both chemistry and biology followed the experiments as outlined in a manual or textbook. Eighty-three of the 91 teachers of biology and chemistry indicated that the laboratory and the classroom were physically combined. Only 12 percent of the teachers indicated that they sponsored some form of a science club. Fifty-five percent used field trips. Sound movie projectors were the most available teaching aid yet their median use was only six times a year by the chemistry teachers and 10 times a year by the biology teachers. Twenty-six percent of the reporting teachers indicated a "good supply" of science books in the library. Forty-four percent indicated a "fair supply," and 30 percent indicated a "poor supply." No differentiation of instruction for college preparatory and terminal students was provided by 27 of 58 responding biology teachers and by 22 of 47 responding chemistry teachers.

On the basis of achievement scores of 1980 biology students and 1352 chemistry students Anderson (4) utilized the same technics as were reported in determining certain factors related to achievement. Students achieved more in biology when the number of laboratory hours received was in the upper quartile of the state distribution; the time of laboratory instruction was not found to be significant; and, unlike the data secured in Anderson's other study (2), there was no difference in student achievement in biology when those using laboratory manuals were compared with those that did not use laboratory manuals. Scores on the chemistry test, however, favored those that used laboratory manuals. As 91 percent of the chemistry teachers used a laboratory manual this datum may be of doubtful validity, for other uncontrolled variables may have operated.

Space limitations gave Ahmann (1) a basis for comparing the effectiveness of instruction in college chemistry when students carried on laboratory work and recitation work at the same laboratory desks in three two-hour periods per week while another group of students followed the more conventional pattern of four one-hour recitation and lecture periods together with one three-hour laboratory period a week. The same textbook, laboratory manual, equipment, and facilities were used in both classes. One hundred forty-seven men, engineering freshmen, in each group were given the same final examination. Statistical analysis showed the methods to be equally satisfactory in terms of student achievement.

Miller and Dresden (20) studied certain apparent results of instruction in physics and chemistry in which the use of advertising materials, pamphlets, periodicals, and similar current materials was emphasized. Over the three-year period of the study one day a week was devoted to topics for which the current materials were the basic study matter. Con- siderable assistance was given the students in the proper use of materials and in developing their ability in terms of group process, individual initia- tive, and leadership. The experimental group consisted of students of one school in California. Students from two other California schools com- prised the control group. Altho no evidence is reported of the compara- bility of these groups in socio-economic status, aptitude, reading ability, periodicals commonly used in the home, etc., and altho the IQ's of the experimental and control groups were not equated, the IQ's of the former group were reported to average 105.0 while that of the two groups constituting the control group averaged 109.2 and 113.5 respectively. Com- parison of the groups on the basis of scores made on the Cooperative Physics tests and the Cooperative Chemistry tests showed that the regularly accepted curriculum achievement by physics and chemistry students is not lessened by devoting one-fifth or more of the time to the study of current materials. Results from the use of the *Time* Current Affairs Tests indi- cated that the experimental group had a superior knowledge of current affairs each of the three times the test was given. The author sent a ques- tionnaire to 83 graduates of the experimental classes of the previous two years and received 61 replies. The graduates were spending, on the aver- age, 9.9 hours per week on current materials according to their replies. Noncollege graduates averaged 13.4 hours according to their replies. Science reading in current materials was represented as the chief topic of interest of the graduates with "Universal Military Training" and "Russia" running a poor second. It was the judgment of the authors that interest was developed in current periodicals, current affairs, and current science, and that this interest tended to persist after the students left high school.

Smith (27) reported two studies bearing on the relationship between intelligence and the learning that results from the use of educational motion pictures. One of these studies was the author's own which was primarily concerned with a determination of the relative effectiveness of teacher demonstrations and motion pictures in producing learnings. The other was a study co-sponsored by the University of Nebraska and the state Department of Public Instruction. Five different tests of factual information and understandings of generalizations were employed. It was found that intelligence and gain in factual information and understandings were positively related and were independent of the methods of instruction utilized. The Smith study disclosed, clearly, that there was no statistically significant difference in the correlations of gain and intelligence in the film sections of students when compared with such correlations in the demonstration sections. Neither films nor demonstrations produced learnings superior to the other with either bright or dull students.

Hellman (15) attempted to compare the results of a science test administered to students living in urban and in rural areas in order to determine the significance of this environmental difference in the four categories of factual knowledge, conceptual abilities, interpretation of charts, and ability to think thru abstract questions. The author equated the two groups in terms of size of schools, equipment available, and the use of standard textbooks and held that any differences obtaining in the results would be due to environmental conditions related to the living area of the students. No significant differences were found except in the area of abstract thinking.

Baar (5) attempted to compare the results of three general "enrichment" technics in instructing four classes of ninth-grade general science students each semester over a period of two semesters. The achievement of the experimental and control groups was measured by a scientific attitude scale; a social implications of science test; the Cooperative General Science test; and a test of applications of principles in physical and biological science. For the first semester the control group was taught by lecture, demonstration, and textbook recitation. One experimental class was taught thru a problem approach technic; another by giving considerable attention to the social implications of science; and the third by "differentiated enrichment activities." During the second semester the control group continued as during the first semester; but two of the three enrichment technics were combined in each of three experimental classes so that each of the three technics were combined with one of the other two. Twenty students from each group were equated on the basis of mean reading grade, initial test mean, standard deviation on initial test scores, and sex. Each first semester experimental group showed greater growth in ability to determine cause and effect relationships than did the control group altho the differences were not statistically significant. When the experimental methods were combined in the second semester, the groups employing the problem approach as one of the two methods showed statistically significant gains in this ability over the control group. Baar concluded that the ability to carry on the many kinds of activities employed in the study of science is specific rather than general and that the type of reasoning used in problem-solving is different from the reasoning used in applying scientific principles. The problem approach showed no significant advantage over the control method in improving ability to apply scientific principles, but it was superior (altho not statistically significant) in teaching understanding of social implications of science, achievements of science, and in tackling scientific problems.

Friedenberg and Smith (14) reported data from the former's study of a technic for developing a chemistry course at the junior college level designed to meet the needs of students. A functional approach was used in which a selected reference shelf was used instead of a textbook. The choice of reading was left to the students. No daily assignments were made, and student need determined the course organization. An elected student committee evaluated the course periodically. Each student in this experimental course was matched on certain relevant particulars with a student in a conventionally organized course. Originally there were 46 matched pairs, but drop-outs reduced the number to eight pairs by the end of the study. The authors report that examinations given to the two groups disclosed a superiority of the experimental group in the ability to use chemistry intelligently as consumers of goods. Detailed information regarding the procedure was not presented in the article, and the small number of cases provide only presumptive data. Considerable investigation is needed in the area of this study. Limited comparative studies would be of less value (due to the difficulty of controlling variables) than would carefully designed and controlled descriptive studies with adequate technics for evaluating shift in the direction of the objectives of instruction.

Status of Elementary Science Teaching

Only one usable study related to the status and teaching of elementary science was discovered in the literature of the review period. Lammers (17) interviewed a representative sample of 100 teachers of the first six grades in 81 public schools in Massachusetts. The interview technic was held constant and consisted of 38 questions. He found that 74 percent of the teachers felt free to use science materials in their instruction; but that such materials were introduced by means of special science periods ranging from 15 minutes to 120 minutes per week, and by correlation with other subjects. About half of the teachers relied on correlation and incidental teaching for science instruction. More than half indicated a preference to base their science instruction on the interests of children. The extent of science work in the professional training of the teachers was reported. Science topics were taught chiefly thru reading and discussion, altho some mentioned demonstrations, experiments, field trips, and films. The frequency with which these latter aids were used was very low, according to the author. About 62 percent were found to have "fairly adequate" textbooks and reference materials.

Science Teaching and Attitudes

Only one study reporting empirical data on attitudes toward racial and religious groups was available in the literature of the review period. Solomon and Braunschneider (28) attempted to determine if attitudes of students in biology at Michigan State College related to ethnic, racial, religious, and nationality groups would shift as a result of instruction designed to apply the scientific method to such prejudicial attitudes. The control and experimental groups were unequated, and the authors indicate that more adequate control was needed. The two control groups were students in the first and second quarters of biological science in which nothing was taught on the races of man. The experimental group consisted of third quarter students who were helped in applying the scientific method to the problem of racial prejudice. A questionnaire was given to all three groups of students simultaneously. This instrument was a "social distance" scale on which the respondents indicated whether or not an individual in a given national, racial, or religious group should be permitted to engage in each of 12 activities ranging from school attendance (with majority group individuals) to dancing with a student not of his own group. One thousand ninety-one students comprised the control group, and 1334 made up the experimental group. Thirty-two percent of the control group students indicated that members of the nine specified national, religious, and racial groups should be permitted to participate in all 12 activities proposed. Forty-two percent of the experimental group so indicated in all 12 activities. The authors' conclusion was that teaching for the purpose of applying the scientific method to problems of prejudice does have a positive effect in the direction of the objectives.

Mohler (21) reported the use of group methods of instruction in an experimental unit on mental hygiene. The experimental unit was developed on the basis of interviews with students enrolled in biology classes over a two-year period and was built around the needs and desires of the students as thus expressed and further revealed in anonymous responses to two questionnaires. The experimental unit was used in three biology classes taught by three different teachers. A pretest and post-test to which all students responded anonymously constituted the main basis of judging the effectiveness of the instruction. The instruction included individual investigations in areas of student concern; laboratory exercises chiefly concerned with sensory impressions; group analysis of reproductive physiology; and group analysis devoted to increased "understanding of one's self." An attempt was made to keep the materials studied related to student experience and background and to avoid theoretical psychology as such. The students engaged in individual consultations with the teachers, engaged in considerable library research, and worked in small groups in which common problems were discussed and ideas exchanged. The teachers assisted the students in improving their group work and the classes engaged in analysis of the group process.

According to the author the students gained new insights into their behavior, faulty knowledge was corrected, and the major objectives of the unit were apparently achieved. In the pretest only 57 percent of the students indicated that they had knowledge in regard to sex questions. Eighty-seven percent so indicated in the post-test. Forty-eight percent indicated, on the pretest, that they had personal problems. Seventy percent, on the post-test, indicated that they had reached some understanding of their problems. Only 20 percent indicated, on the pretest, that they knew the elements of mental hygiene. Seventy-two percent felt that they had a better concept of mental hygiene at the end of the unit. On the question: "Are you happy?" 73 percent yes responses on the pretest changed to 87 percent on the post-test. On the question: "Do you like school?" the yes responses increased from 80 percent to 95 percent.

Critical Thinking and Scientific Method

Edwards (13) has reported the general procedures used in an experimental college course in science designed to serve as general education for prospective art teachers. His report includes both objective and subjective evidence of results of the instruction. The 30 students and the instructor engaged in informal discussion of the objectives of the course and worked primarily in small groups of flexible composition. Problems of the immediate environment were attacked, and students developed group projects. Pretest and post-test scores disclosed growth in knowledge of scientific facts. The tests used were developed by the author, and only raw scores and the mean are reported. Pretests and post-tests of critical thinking (the instrument was not reported) showed no change in this particular, altho improvement in this skill was consciously sought thruout the semester. The report of the study does not provide information on which a basis for judgment of the validity of the instrument might be made.

Owens (23) attempted to investigate the relationship between the ability of high-school pupils to recognize scientific principles in test situations and the ability to apply these principles to problematic situations. His study also undertook to determine the effects of directed teaching on the ability of students to apply scientific principles to situations not previously encountered. Owens used 296 high-school students in one public high school for his study. These were in six biology classes and four chemistry classes. The investigator and two other teachers each taught both control and experimental classes. Both control and experimental groups were subjected to the same general teaching procedure, but the students in the experimental group were directed to seek additional problems in each unit, were directed to state applications of scientific principles to everyday living, were requested to read additional references, to solve additional problems, and to keep a definitely planned notebook containing applications of the scientific principles to everyday living. In addition, the experimental group prepared a summary showing how the applications compiled by each student were related to the scientific principles.

The two groups were matched on the basis of IQ, chronological age, and mental age. Two tests were constructed by the author. One, of suitable reliability, was designed to measure ability in recognition of scientific principles. The other, with a coefficient of reliability of .60, was designed to measure the ability to apply scientific principles to new situations.

Owens found that the students in his study showed greater ability in recognizing scientific principles than in applying them to new situations. He found a significant difference in favor of the experimental group in the ability to recognize and to apply scientific principles to new situations. Students of high measured intelligence were superior to those below the mean in their ability both to recognize and to apply scientific principles to new situations. The author pointed out that the tests used were limited and that more tests of high validity designed to detect ability to apply scientific principles to new situations are needed. He noted, further, that the problem-solving technic was used with both groups and that both groups showed improvement in the investigation.

A fundamental weakness in all studies relative to scientific method and scientific attitude is that there is no clear general agreement as to what comprises these qualities. Lampkin (18) undertook a study of scientific inquiry as it appeared in selected high-school science books. Each textbook was dismembered, and 12 composite books containing fragments of the original books were formed. Twelve readers, six each who were majoring in science teaching and in philosophy, analyzed one each of the composite texts. Each reader was asked to determine what portions of the book represented what steps in the scientific method of inquiry. Altho these readers utilized Mr. Lampkin's detailed formulation of scientific inquiry, there was lack of agreement among them in recognizing and classifying the elements of scientific inquiry. This study seems to show that there is little common agreement among science-educators-in-training, as well as between science-educators and philosophers-in-training on what constitutes scientific method as a method of inquiry, or of its aspects. If this be true, it doubtless accounts, in large part, for the lack of evidence that science teaching has contributed significantly to the development of scientific methods of work. It is obvious that objectives must be clear and well understood before they can be achieved or evaluated.

One phase of Anderson's comprehensive study (3) of chemistry and biology teachers and their work included eight questions on the nature of scientific method. A problem was included. The 58 chemistry teachers and 55 biology teachers who responded to the questions showed evidence, according to the author, of "a lack of knowledge concerning the scientific method. It suggests that they were busy imparting factual information to their students . . ." apparently to a rather high exclusion of emphasis on scientific method and attitudes.

Reiner (24) compared two teaching procedures with reference to their effectiveness in producing growth in the ability to recognize direct, indirect, and negative cause and effect relationships. The experimental procedure differed from the control in the single respect of including specific training in the analysis of causality related to demonstrations. The classes were ninth-grade general science, and each instructor taught at least one experimental and one control class. There were 169 children in the experimental group and the same number in the control group. The students were equated on the basis of IQ and scores made on an initial test designed to detect ability in causality recognition. The experimental group made greater gains in total ability to recognize cause and effect relationships. Its advantage over the control group was expressed as 1.347 sigmas. Three IQ levels were considered in the study, and the experimental group showed superiority at each level altho the advantage of the lowest IQ experimental group was only 1.006 sigmas over the control group. Boys surpassed girls. The superiority of the experimental groups was in terms of the recognition of indirect and negative causality only, for the control group made a slightly greater gain in recognizing direct causality.

Bingham (6) reported tentative and preliminary findings on a cooperative project designed to determine whether or not certain elements of the scientific method can be taught directly thru the use of a specific instrument designed for teacher use in connection with selected demonstrations. Each instrument was, in essence, a brief problem unit such as "How does water affect a hot fat fire?" Direction sheets provided to the teachers of both experimental and control groups proposed the same steps to be followed in connection with demonstrations related to the problem units with the exception that the experimental groups were given an opportunity to consider the various steps of scientific method related to the demonstrations. Test sheets provided the basis of determination of student achievement in the use of the scientific method. The authors analyzed only one teacher response in the report being considered. This case compared 39 ninth-grade children in the experimental group with an equal number of students in the control group. There was no effort at equating possibly related variables. Preliminary test results were compared with test results following the demonstrations. The experimental group was found superior in recognizing assumptions that underlie conclusions and in applying conclusions satisfactorily but showed little advantage over the control group on other measured factors.

It is encouraging to find continued studies of critical thinking and procedures of inquiry in the literature. It is to be hoped that studies in the future will be sounder in conception, better executed in terms of control of possibly related variables, and be based upon more explicitly stated and validated assumptions and criteria. More valid technics of evaluation are urgently needed. Sound research design is necessary in this important and difficult field of investigation. Large numbers of studies of low validity are misleading in their conclusions.

College General Education Courses

The general ferment in education continues to affect the colleges. General education courses are growing in number and experimentation with various types of courses continues.

Under the sponsorship of the Cooperative Committee on the Teaching of Science and Mathematics of the American Association for the Advancement of Science, Bullington (8) undertook to determine the status, trends, objectives, content, and procedures of general education college science courses thru the utilization of a comprehensive questionnaire. This inquiry form was sent to 967 four-year colleges, universities, and teachers colleges thruout the United States. Replies were received from 660 schools. Information on 60 additional schools was secured from perusal of catalog statements. Of 720 schools for which data are available (this represents 74 percent of the 967 four-year colleges and universities in the United States), 59 percent offer general education courses of some kind. Two hundred twenty-one of the schools report both biological and physical science courses designed for general education purposes. Eighty-one schools report a general course covering both biological and physical science. Fifty-eight schools report only biological science courses, and 42 report only physical science courses. Sixty-three schools report specially designed single-subject courses. Bullington found that general education courses in the sciences are much more prevalent in teachers colleges than in other schools. Eighty-one percent of the teachers colleges reported such courses. The author obtained detailed information about 150 courses from 103 colleges of all sizes. The subjectmatter survey approach was the most commonly used method of teaching in these courses. It was reported as the only method used in 42 courses of the 150. The study of selected units ranked second in frequency with 31 courses employing it. Twenty courses used selected problems as the basic approach, with an additional 13 using this method in combination with one or more additional methods. The historical development approach was used in 11 courses. Bullington (9) reports that the most frequently used methods of determining subjectmatter content are, in order of prevalence: (a) a determination of student needs; (b) the selection of a textbook, (c) a study of the interests of students in the class, and (d) the use of material selected to survey a field of science. Bullington reports the typical course as one year in length, given by two or more teachers, and employing demonstrations, visual aids, field trips, and laboratory activities in addition to lectures and discussions. Student opinion of the courses was sampled thru the administration of a questionnaire to 1200 students in 14 courses (9, 10). Seventy-seven percent of the students ranked the courses as above average in the choice and utilization of instructional procedures and materials.

Another general survey of college general education courses in the United States was conducted by Washton (29). His findings were approximately the same as Bullington's in most particulars. Washton developed a questionnaire designed to elicit certain facts about college science courses designed for general education. Questionnaires were sent to 500 liberal arts colleges distributed over the United States. The author received an 84 percent response. Forty-six percent of the responding colleges had no general education or survey-type courses in science. Forty-five percent had one or more survey or general education science courses. Of these 190 colleges, 71 offered a general education course in the biological sciences; 61 offered such a course in physical sciences; and 74 offered courses that combined both the biological and the physical sciences. Most colleges reporting general education courses indicated that these ran for two semesters. The majority of the colleges omit laboratory instruction from the general education science courses. Lecturing assumed much more time than discussion in the majority of the courses and most of the respondents indicated the chief purpose of the courses as informative. Thirty-two of these courses were reported to enrol over 100 students in the lecture sections. However, the majority reported lecture sections of less than 50 students. In the physical sciences only 11 institutions reported the utilization of demonstrations while 12 additional institutions reported demonstrations in courses that combine the biological and physical sciences.

Another study designed to determine the status and trends in general education science courses at the college level was conducted by Reynolds (25) who sent a questionnaire to all four-year state teachers colleges in the United States. Replies were received from 79 colleges (60 percent of the total) well distributed over the United States. The author compared the results of this 1949 study with a similar survey he had made in 1938. He found that 85 percent of the schools required students to take generalized science in 1949 while only 78 percent had this requirement at the time of the previous study. Twenty percent of the schools required the course for elementary majors in 1949 as against 11 percent in 1938. In 1938, 47 percent of the class time was devoted to lecturing, 41 percent to lecture-demonstration, and 10 percent to individual laboratory work. In 1949 this had changed to 56 percent devoted to the lecture method, 23 percent to lecture-demonstration, and 14 percent to individual laboratory work.

Conant (11) has presented a progress report on the use of the case-history method in teaching the principles of the "tactics and strategy" of science to a group of 150 nonscience major freshmen and sophomores as a part of the new general education program at Harvard College. The procedure in this course, suggested earlier in Conant's *On Understanding Science*, is an intensive study of several cases in the history of science which illustrate the general nature of science. The students turned in two unsigned questionnaires which, together with student reactions in the discussion periods, form the basis of the evaluative aspects of the progress report. According to Conant the better students had greater interest in the course and appeared to benefit most from it. The bulk of the students placed this course second or third in terms of interest, among the four they were taking.

Among the fields that should be investigated in connection with college general education science courses are the following: (a) status, training, and strengths and weaknesses of instructors of such courses; (b) evidences of strengths and weaknesses of the several types of general education courses from sociological, psychological, and empirical bases; and (c) detailed descriptions of promising technics together with valid and reliable evidences of the effectiveness of such procedures. There are little or no data of worth on any of these points at present.

Teacher Training

Curtis (12) utilized a questionnaire to determine the judgment of elementary teachers in the District of Columbia on the adequacy of their science training and on related matters. Five hundred sixty-nine teachers returned the questionnaire. Four hundred fifty-nine of these felt that appropriate in-service training should be provided on elementary science. Workshops were specified most commonly as the means preferred for this training. Five hundred nineteen of the respondents stated that they believed that preservice training in science for elementary teachers should be strengthened, while only 36 replied in the negative. In order of frequency of mention, the following represent these teachers' viewpoints on areas needing stress in professional training related to science teaching (over 300 listed each one): the use of environmental materials, laboratory experience, laboratory construction, collection of resource material, sources of audio-visual aids, technics of field trips.

Blisard (7) provided a general description of a college general education course in physical science attended primarily by prospective elementary-school teachers. A subjective evaluation of the results of the course was given.

Salem (26) utilized questionnaires formerly developed and administered to science teachers in the United States by Burnett in order to study the opinions of biology teachers in Egypt and to compare their responses with those of American science teachers. Two separate questionnaires were used in the Burnett study. Salem's study used these, in slightly modified form and, in addition, added another section dealing with the aims and objectives of biology teaching in Egypt. His findings were that:

(a) an overwhelming majority of Egyptian biology teachers (like American science teachers) hold their chief responsibility to be that of facing the problems and interests of youth and society and bringing their specialized competencies as teachers to bear on these problems and interests; (b) the six issues most commonly chosen by Egyptian biology teachers to be avoided entirely were conflicts between traditional religions and science over views of the universe and man's place therein, comparative progress of science under various political systems, racial prejudices, relative merits of various healing arts, questions of moral codes and ethical principles, and present social maladjustment brought about by the impact of science on society; (c) these very issues were, with one exception, those held to be of the greatest instructional value to young people (practically the same findings as in Burnett's study of American science teachers, both in the areas held of high significance and in avoidance); (d) Egyptian science teachers held most commonly that the lack of maturity of pupils, insufficient personal knowledge (on the part of the responding teacher), fear of outside pressure groups, and disapproval of parents were their reasons for avoiding these areas of significance in their teaching. These were precisely the same reasons as specified by American science teachers. It should be noted, however, that Salem's study had the same defect as the Burnett study in that these four reasons for avoidance were specified (in the Egyptian study) with no others pegged in the questionnaire. The Burnett study listed six reasons. Both studies provided space for the expression of other reasons but virtually none were provided by the teachers responding in either study. A separate section of each study was devoted to securing the viewpoints of science teachers on such controversial issues as racial differences, socio-economic differences, the immutability of human nature, the control of scientific research, and some aspects of supernaturalism. Responses were tabulated somewhat differently in the two studies. Salem reported that much higher percentages of American science teachers, as opposed to Egyptian biology teachers, expressed opinions that are in consonance with the commonly accepted tenets of science. Salem further reported that the disciplinary or training aim and the religious aim of biology teaching was held by the majority of Egyptian biology teachers along with the more commonly endorsed objectives of science teaching in this country. The belief that college preparation without particular attention to general education should be the goal of the science teacher in the secondary schools of Egypt was expressed by more teachers who had not had education courses than by those who had taken such courses, and the difference was statistically significant.

This study represents one of the few studies on comparative education in science to date. Here is a field that merits considerable investigation. American science teachers know little of what is being done in other countries. The Salem technic of utilizing instruments and procedures already employed in the United States provides an interesting basis for close comparison. It is hoped that such studies, in the future, will eliminate, where possible, defects in the original instruments and technics.

Descriptive Accounts of Programs and Procedures

Altho most of the specific studies growing out of the work of the Bureau of Educational Research in Science at Teachers College, Columbia University, have already been reported in the literature, the report by Laton and Powers (19) of the experiences and procedures of teachers in 17 secondary schools that cooperated with the Bureau provides an interesting record of general technics and procedures designed to make science teaching more functional. The descriptions include accounts of new emphases within existing courses and the development of new courses, both within science departments and by integrating science with other areas such as social sciences.

Murray (22) used the group process in developing demonstrations based on biological principles previously compiled by Edgar W. Martin and physical principles compiled by Harold E. Wise. The demonstrations were designed to employ simple and easily available materials and were constructed for the use of junior and senior high schools. The study was designed to develop new and improved demonstrations and is descriptive as to process.

Large numbers of colleges have changed from macro-technic in chemistry to semimicro-technic. A fair number of high-school teachers have modified their program in the same direction but there is, as yet, little substantial evidence of the results of the change. A study by Hoff (16), while not providing such data, is of interest at this time, for he undertook an operational analysis comparing the two technics and interviewed a selected group of teachers in central New York State relative to questions they had regarding changing from the macro- to the micro-method. The author then attempted to correlate the questions and to answer them under the belief that the questions raised would be typical of those arising in the minds of most high-school chemistry teachers considering such a change. The author concluded that the advantages accruing to the semimicro-technics far outweigh any presently known disadvantages when compared with macro-technic. It is to be hoped that many teachers, utilizing Hoff's report of questions and his answers, will undertake careful analyses, under suitably controlled conditions, to provide needed information as to the actual advantages and disadvantages of semimicro-technic on an empirical basis.

Bibliography

1. AHMANN, J. STANLEY. "A Comparison of Teaching Methods." *Journal of Chemical Education* 26: 409-10; August 1949.
2. ANDERSON, KENNETH E. "A Study of Achievement in High School Chemistry in Several Eastern and Midwestern States." *Science Education* 34: 168-76; April 1950.

3. ANDERSON, KENNETH E. "The Teachers of Science in a Representative Sampling of Minnesota Schools." *Science Education* 34: 57-66; February 1950.
4. ANDERSON, KENNETH E. "Summary of the Relative Achievements of the Objectives of Secondary-School Science in a Representative Sampling of Fifty-Six Minnesota Schools." *Science Education* 33: 323-29; December 1949.
5. BAAR, LINCOLN F. "Critical Selection and Evaluation of Enrichment Methods in Junior-High-School General Science." *Science Education* 33: 333-43; December 1949.
6. BINGHAM, N. ELDRED. "A Direct Approach to the Teaching of the Scientific Method." *Science Education* 33: 241-49; April 1949.
7. BLISARD, THOMAS J. "Developing Physical Science Experiences thru the Use of Cooperative Group Processes." *Science Education* 33: 366-71; December 1949.
8. BULLINGTON, ROBERT A. "A Study of Science for General Education at the College Level." *Science Education* 33: 235-41; April 1949.
9. BULLINGTON, ROBERT A. "Summary of a Study of College Science Courses Designed for General Education." *Association of American Colleges Bulletin* 36: 267-72; May 1950.
10. BULLINGTON, ROBERT A. "A Study of Student Opinion of College General Education Science Courses." *Science Education* 34: 73-77; March 1950.
11. CONANT, JAMES BRYANT. *The Growth of the Experimental Sciences.* Cambridge: Harvard University Press, 1949. 67 p.
12. CURTIS, WILLIAM C. "The Improvement of Instruction in Elementary Science." *Science Education* 34: 234-42; October 1950.
13. EDWARDS, T. BENTLEY. "Physical Science for Art Students." *California Journal of Secondary Education* 25: 238-42; April 1950.
14. FRIEDENBERG, EDGAR Z., and SMITH, OTTO M. "Adapting a College Chemistry Course to Student Needs." *Journal of Chemical Education* 25: 681-85; December 1948.
15. HELLMAN, EUGENE EDWARD. *The Significant Differences Found in Certain Areas of Science Learning Between Ninth Grade Rural and Urban Pupils.* Master's thesis. Boston: Boston University, 1950. (Typewritten)
16. HOFF, FOSTER H., and BROWN, ALFRED S. "Semimicro Technics for High Schools." *Journal of Chemical Education* 26: 530-33; October 1949.
17. LAMMERS, THERESA J. "One Hundred Interviews with Elementary School Teachers Concerning Science Education." *Science Education* 33: 292-95; October 1949.
18. LAMPKIN, RICHARD H. "Variability in Recognizing Scientific Inquiry." *Science Education* 33: 16-20; February 1949.
19. LATON, ANITA DUNCAN, and POWERS, SAMUEL RALPH. *New Directions in Science Teaching.* New York: McGraw-Hill Book Co., 1949. 164 p.
20. MILLER, MILES MAX, and DRESDEN, KATHARINE. "Current Approaches in the Teaching of Science." *School Science and Mathematics* 49: 359-65; May 1949.
21. MOHLER, CHARLES W. "High School Biology and Mental Hygiene." *School Science and Mathematics* 50: 713-24; December 1950.
22. MURRAY, C. E., editor. "New and Improved Demonstrations, Each Illustrating a Single Scientific Principle." Master's thesis. Boston: Boston University, 1950. (Typewritten)
23. OWENS, J. HAROLD. *The Ability To Recognize and Apply Scientific Principles to New Situations.* Abstract of doctor's thesis. New York: New York University, 1949.
24. REINER, WILLIAM B. "Evaluating Ability To Recognize Degrees of Cause and Effect Relationships." *Science Education* 34: 15-28; February 1950.
25. REYNOLDS, CHARLES W. "Trends and Present Status of Generalized Science in State Teachers Colleges." *Science Education* 34: 77-80; March 1950.
26. SALEM, MOHAMMED MOKHLISS. *The Training and Attitudes of Egyptian Biology Teachers and American Science Teachers.* Doctor's thesis. New York: Teachers College, Columbia University, 1950. (Typewritten)
27. SMITH, HERBERT A. "The Relationship Between Intelligence and the Learning Which Results from the Use of Educational Sound Motion Pictures." *Journal of Educational Research* 43: 241-49; December 1949.
28. SOLOMON, MARVIN D., and BRAUNSCHNEIDER, G. EDWARD. "Relation of Biological Science to the Social Attitudes." *Science Education* 34: 80-84; March 1950.
29. WASHTON, NATHAN S. "A Survey of Science Courses for General Education in Colleges." *Association of American Colleges Bulletin* 34: 285-94; October 1948.

CHAPTER III

Materials in the Teaching of Science

JOHN S. RICHARDSON, G. P. CAHOON, and JAMES A. RUTLEDGE

THE development of teaching materials has been expanding rapidly for several decades. The effect of World War II was to reemphasize the value and need of such materials and to sharpen the imagination of teachers and students alike as to the use of these materials in ordinary educational situations. The increasing technological developments of the past few decades have necessitated more materials and have led to relatively new technics in their production. The profession of education has sensed the need for restudying the purposes, usefulness, and effectiveness of teaching materials. The area of science by its very nature has found this need rather acute.

The term *materials* here designates any of the physical devices used in the teaching of science. Within the purview of this study are books, magazines, pamphlets, motion pictures, filmstrips and slides, and laboratory and demonstration equipment. There are, of course, groupings and derivatives of such types of material which likewise are appropriately the subject of reporting where research has been carried out.

Scope of Concern

One of the most significant investigations dealing in part with materials was that by Johnson (8) of the United States Office of Education. A sample of high schools stratified according to size and type provided information on several aspects of the teaching of science in the public schools of the United States. Data were sought from 755 high schools, 3.15 percent of the total in the nation. Usable data were received from 715 high schools, 2.99 percent of the public high schools. The study included in part a determination of troublesome or difficult problems in the teaching of science. A tabulation of the type and frequency of the problems indicated is given.

Of the total number of difficult problems, those relating to books constitute 2.4 percent; those to rooms, 23.6 percent; and those to supplies and equipment, 33.4 percent. If the problems relating to books, rooms, and supplies and equipment are grouped, they constitute 59.5 percent of all the troublesome problems given. It is significant that the major portion of all problems listed by the respondents is in the field of materials of science teaching.

A comparison of the total list showing the type of school and the problems reported by each type indicates that the problems are distributed in approximately the same proportions as the types and sizes of schools in the sample. "This indicates that the problems reported were common to all types and sizes of schools and whatever can be done to help meet the problems will therefore help all types and sizes of high schools."

Materials for Elementary-School Science

A survey of the problem of teaching materials for elementary-school science was made by Hubler (7).

The study involved 60 teachers from central Connecticut and was concerned with their problems of teaching materials in science. The teachers were from 39 elementary schools in 29 cities, villages, and rural areas. They represented the six grades equally. Twenty-seven questions ranging from the appropriateness of science in the work of the elementary school, thru the problems which prevent the improvement of science instruction, to the expressed wishes of teachers as to the content of a science handbook for elementary teachers were asked.

The respondents agreed on the importance of science in the elementary curriculum, and on the desirability of materials for science instruction. The lack of adequate materials was a problem for a majority of the teachers, even tho they reported that considerable science was being taught in spite of this deficiency. The study revealed a lack of understanding on the part of the teachers as to their needs and ways of meeting them.

A second portion of the study was concerned with lists of recommended materials and their availability.

The needs of elementary teachers and their participation in the preparation of materials was studied by Greenlee (6).

The purpose of this project was to put into usable form a source book of science experiences for the classroom teacher to use in enriching the learning environment of preschool and early elementary-school children.

The major portion of the project consisted of suggested science experiences and interpretations dealing with seven major topics (e.g. "Children's Experience with Soils and Rocks"). A wide variety of experiences was suggested under each topic.

The final draft took into consideration the critical suggestions of 12 classroom teachers and supervisors who read the original manuscript as a whole or in part.

Boer (3) studied the use of sensory aids in teaching science in the primary grades. The children were taught to find the answers to their questions and problems of scientific nature by experimenting. Large charts were made to serve as a record of the basic aspects of their experiments: *what we did, what happened,* and *what we found out.* Story charts were mimeographed and made into booklets for the children. Pictures from magazines were placed on the bulletin board. For example, weather reports in the newspapers were related to the radio reports, to the barometers they had made, and to the weather itself.

Without presenting the evidence in objective form, the author concluded that the children learned to be a little more considerate of each other, listened politely when others were talking, worked together better in groups, became more alert and observant to things about them, developed the habit of forming conclusions from facts they had learned instead of accepting anything that was told them or jumping at conclusions.

Read (17) made a study of 131 basic readers from preprimer thru the sixth grade, noting the scientific facts, principles, concepts and attitudes *expressly* included, but omitting geography, customs, and home gardens and household pets. The percent devoted to science ranged from 12.8 to 19.4, with an average of 16.5. A table is given showing the distribution among topics of the total number of pages *devoted to science.* A second table shows the form of presentation of the science materials. The author concluded that the books rely too heavily on the biological sciences, particularly on animals. The physical aspects of science were largely neglected. It is interesting and probably significant that little science is taught by experimentation.

Reading Materials for High-School Science

The planning of a series of junior high-school science textbooks was the subject of a study by Neal (16). On the basis of science necessary to general education, he isolated such aspects as health, safety, consumership, and conservation, as well as others. He suggested an organization of junior high-school science textbook materials around typical situations found to be useful in helping children to understand relationships appropriate to general education. Evidence was summarized from policy-making statements on curriculum and teaching. Policy level statements from publications in the field of science education were summarized and utilized to the extent that they contribute to the undertaking at hand.

The second half of the report outlined and illustrated suggested junior high-school science textbook materials intended to serve as resources for general education.

Anderson (1) studied the availability of reading materials for science in a random sample involving 56 of the 483 high schools in Minnesota. A study was made of such adjuncts to science instruction in biology and chemistry classes as the field trip, the science club, library books, periodicals, and visual aids. The study determined in part the judgment of the teachers as to the supply of science books in the school library. The percent of teachers replying in each of three categories is as follows: good supply, 26 percent; fair supply, 44 percent; poor supply, 30 percent. The median number of magazines of scientific nature available to students was 1.64.

A study of the reading difficulty of science textbooks was carried out by Mallinson and others (11). A sampling technic was utilized in connection with the Flesch formula. On the basis of a study of 10 three-book series and two two-book series in junior high-school science, the investigators concluded that the textbooks in science for Grades VII, VIII, and IX are likely to cause some reading difficulty for all but the better students in these grades. The relative difficulty seems to be greatest in the textbooks for Grade VII. There is no evidence that the easiest portions of the textbooks are found toward the front of the books. The differences between the levels of difficulty of the easiest and the most difficult textbooks are statistically significant.

The same investigator (10) in a study of 26 biology textbooks found a wide variation in the reading difficulty, ranging from a level of Grade VI completed thru college completed. In view of the more common years of the study of biology in high school (Grades X and XI), serious problems of reading difficulty are likely to be encountered.

The extent of use and methods of use of teaching aids in biology textbooks were the concern of a study by St. Lawrence (19). Fourteen teaching aids were involved. Evaluations were provided by teachers. Generalizations derived from the study were: that determined by the extent of use, textbook teaching aids were not generally conceded by teachers to be of educational value; that textbook authors' reasons for the inclusion of these aids did not appear to have much relationship to the facts of use; that factors of teacher training, teaching experience and school size had little influence upon the extent of use and method of use of teaching aids. Major reasons indicated by teachers for not using textbook teaching aids were that they provided their own materials and that similar and more appropriate aids were otherwise available.

Business-Sponsored Materials for Science Teaching

Recent years have brought a major increase in the numbers and types of business-sponsored materials useful to science teaching. Available research reflects the concern of educators, as well as others, that the material be carefully prepared and effectively used.

One of the more significant research studies in this field was a survey by the National Science Teachers Association (15). This Association carried out an investigation of the use of materials in an effort to find the general basis of usefulness and the kind of use that materials have. A questionnaire was sent to schools using materials, and a statistically significant return received.

The questionnaire was concerned with 62 items which are classified principally as pamphlets. The titles of these items were given. There were 778 respondents to the questionnaire, of whom 246 had some responsibilities in teacher education. Of the 246, 28 work in teachers colleges. The 778 respondents reported 20 different ways in which they use the materials listed, such as classroom reference, special pupil reports, information for the teacher, etc. A table indicates the number of times each use is mentioned.

Twenty-six of the 62 items were evaluated in terms of the reading difficulty, interest level, reference to other publications, and certain other criteria. The items evaluated were distributed among those of greater and those of lesser difficulty. The Flesch formula was used to determine the reading difficulty. This evaluation resulted in the following conclusions:

1. The 15 items voted lowest in special usefulness were on the average rated as more difficult to read.
2. The significant item that accounts for the difference in difficulty is the length of sentence. The items deemed highest in special usefulness were in general characterized by more sentences of shorter length.
3. The interest level of the reader is dependent upon the immediacy and current attention to the subjectmatter.
4. The popularity among teachers of an item seems to depend upon its "multiple use" in several science subjects.
5. The lack of a glossary has no significant effect upon the use of an item.
6. References to other publications are not essential for the special usefulness of an item.
7. The value of photographs versus diagrams requires further investigation.
8. The presence of photographs does not necessarily make an item easy to read.
9. There are more half-tone pictures in the items voted highest in special usefulness.

Among the conclusions reached in the study as a whole are the following:

1. Ninety-three percent of the respondents at all levels report business-sponsored teaching aids useful in broadening and deepening their own knowledge and understanding of science and technology in modern living.
2. Business-sponsored teaching aids are most widely used by teachers of the junior high-school grades. Ninety-seven percent report the materials useful to them personally.
3. Ninety percent of the respondents from the junior high schools report that business-sponsored teaching aids are useful to teachers and 83 percent of them report that business-sponsored teaching aids are useful to students.
4. Eighty-six percent of the college respondents report that business-sponsored teaching aids are useful to them personally and 78 percent report that business-sponsored teaching aids in the schools.
5. Educational authorities are overwhelmingly in favor of the use of business-sponsored teaching aids in the schools.

The "Report About Business-Sponsored Teaching Aids" by Sinclair (21) is concerned with problems and materials relating to the science area as well as to the other areas in education. The underlying purpose of this study was to discover the characteristic viewpoints of business representatives, classroom teachers, and school administrators on current practices in the production, distribution, and utilization of business-sponsored teaching aids.

The report indicates that data for this study were obtained from three principal sources: (a) Two hundred and eighty-nine classroom teachers geographically distributed, representing all grade levels from one to 12 and representing the various subject areas in junior and senior high-school curriculums; (b) Three hundred and thirty-seven school administrators representing the various public school administrative positions; (c) Eighty-eight business organizations that sponsor free or inexpensive teaching materials.

The investigator used personal interviews and questionnaires to get data both from educators and from business representatives. Responses were obtained from 714 teachers, school administrators, and business representatives.

The major conclusions and recommendations are:

1. Educators favor for each state a single distribution agency to serve all business-sponsored teaching aids.
2. Descriptive lists of materials available from sponsors should be furnished by them, and materials should be provided to teachers and schools at no charge.
3. Materials should be prepared for use at specific grade levels, and by persons who know children and school needs.
4. Sponsored aids should be simple, easy to use and of a standard size and shape for filing.
5. While sponsors have put an emphasis upon materials such as booklets and charts, teachers prefer motion pictures and strip film when these are available.

The problem of improving the quality of brochures used in public schools was the subject of an investigation by Carriger, Lubold, and Govoni (4). Criteria related to pictorial materials, reading difficulty, current interest, and teaching aids were determined.

Investigations were based on commercially produced material. Positive correlations were found between the better liked brochures and matters of current public interest as revealed in the literature, and between the use of colored pictures and the desirability of their use.

Motion Pictures and Filmstrips in Science Teaching

Such projected materials as motion picture films and filmstrips have long been used by science teachers because of their promise in learning situations. The research, while of limited amount, has tended to support the use of these materials. Wise (23) studied the contributions of motion pictures as they supplemented other approaches to teaching. In five high schools, five biology films were shown to all sections except one in each school. The showings involved uniform methods of utilization, including preplanning by the teacher. Each film was used at the most appropriate time, and approximately two periods of class time were used during the study of each film. A 56-item test of multiple-choice type was constructed on the basis of the content of the five films. With an independent group the predicted reliability of the test was determined to be .64. Control groups, one class in each school, did not see the films but spent the equivalent time used by the experimental groups in more complete utilization of other learning activities.

At the beginning of the semester the Film Test and the Cooperative Biology Test, Form P, were administered, and the same forms were given again at the end of the semester. It was concluded on the basis of the relations of the scores that the films must have contributed to student growth in two ways: as an equivalent substitute for other learning activities in the control groups, and as a means of presenting facts and concepts not taught by other methods. The use of a reasonable number of sound motion pictures closely related to the content in biology may materially enrich without detracting from normal student accomplishment.

The relative effectiveness of motion pictures, as compared with other materials, has been the subject of continuing concern among teachers. A comparison of motion pictures and equivalent teacher demonstrations was made by Smith (22). The investigator used three films, one each on magnetism, simple machines, and properties of water. The content of each was readily duplicated in the form of demonstrations by the classroom teachers. In each of five schools having three sections of general science the films were used, rotation of films serving to offset differences in teachers and students. Each section was eventually taught by each method on the successive units. Units were constructed to fit the content of the films. For a given topic in a given school one section was taught using the film and no demonstrations, a second with demonstrations and no film, and a third with both. Sections were rotated as to method for subsequent topics.

The California Test of Mental Maturity and a carefully prepared multiple choice test were used. The same tests were used before and after the experiment. The data were treated statistically. The investigator concluded that sound motion pictures and teacher demonstrations are equally successful in teaching, and that differences in intelligence have no bearing on the effectiveness of one method over the other.

A study of the narration in science films was carried out by Mallinson (9). Ten science films were used, five from biological science and five from physical science. These films were selected by the producers as being best at the junior high-school level. The investigator found 87 words of a difficulty level above Grade VII. He noted that more comprehensible words in the form of synonyms could have been used.

As a portion of his study on adjuncts to science instruction, Anderson (1) determined the availability of projectors in 56 of the 483 high schools in Minnesota. Projectors for motion pictures, filmstrips and lantern slides were available in the order given. He found that none was used fully. The criteria for full or optimum use no doubt were formulated in the investigation but were not indicated in the report.

An analysis of filmstrips in science to determine their inclusion of scientific principles, scientific method, and scientific attitudes was made by Royal (18). Two filmstrips were chosen for each of certain topics in general science. A preliminary analysis of these filmstrips was made by the investigator to determine the scientific principles, methods, and attitudes. These results were submitted to two specialists for validation of the preliminary assignment by the investigator. The filmstrips were reanalyzed one year later by the investigator to determine the reliability.

It was concluded that of 1408 frames in the filmstrips only 574 made any contribution to scientific principles, methods, or attitudes. The major purpose of most filmstrips seemed to lie in their contribution to the topical organization of subjectmatter.

Graphic Materials

Science materials include such graphic materials as cross-sections and process diagrams. The degree of abstractness and subsequent difficulty of interpretation seems not to have been a matter of much concern to science teachers in the past, if the reports in the literature are a reliable index.

Two investigations by Malter indicate a certain awareness of potential difficulties in the use of graphic materials. In one study relating to ability to read cross-sections (12), 348 pupils in Grades IV to VIII were involved. It was determined that most of the pupils were unable to read many of the cross-sections appearing in their reading material. In another study involving 227 pupils in the same grades, they were asked to trace the flow of materials thru a process diagram of a flour mill (13). Most were unable to do so.

Materials for Experimentation

For many years there seemed to be a naive assumption that the primary purpose of the science laboratory was that of demonstrating and observing facts and phenomena already learned—to illustrate and show, but not to *experiment*. There seems to be a growing concern that the materials of the laboratory be used for genuine student investigation. This concern is reflected in research reported in the literature.

In a study made by Forbes (5) the following criteria for significant laboratory experiences were formulated:

1. A cooperatively planned group approach is in effect. The area under investigation is one with which the group identifies itself; one of importance to the people in the class.
2. The experience with concrete materials is introduced because of its potential contribution to current inquiry.
3. Materials are observed and manipulated with an understanding of their general position in the environment. In each experience there is an element familiar to the individual, related to part of his environment.
4. The procedure to be followed is determined by the group. This may involve much original planning, may be adapted from procedures found in publications, or may be suggested by the teacher. Of more

importance than the step-by-step details of the procedure are the reasons for the several details.

5. The several abilities and backgrounds in the group are utilized in the execution of the procedure and fruition of the experience.

6. Among the results, the focus of attention is on the ideas which are contributed by the experience to the association of ideas in which the problem or question occurred.

This problem was approached directly by Boeck (2) who compared thru experimental evaluation the learning of students taught in such a manner as to stress the use of the inductive approach in high-school chemistry laboratory exercises and correlated discussions with the learning of students who were taught by the use of the more commonly found deductive-descriptive exercises.

This study used experimental and control groups. An experimental and control group were selected from the junior and senior class students comprising the chemistry enrolment of the University of Minnesota High School by use of random sampling technics. Seven additional control groups were selected at random from Minnesota high schools of the same sized enrolment. Each of these control groups participated in the measurement of only one part of the total study. No attempt was made to control the type of teaching carried out in these schools. A survey was made of the nature of the teaching, materials covered, and the nature of the total teaching situation. This was accomplished thru a personal visit by the experimenter and the use of a questionnaire checklist. Enrolments in the various classes ranged from 19 to 30.

Measures were taken to evaluate such factors as mental ability and initial status. The examinations used in the study were validated prior to their use.

For the University High School experiment differences not large enough to be significant were found in favor of the inductive method for knowledge of facts and principles, application of principles, performance laboratory technics, and laboratory resourcefulness. However, for two objectives, differences in mean achievement were considered significant. They were (a) knowledge of and ability to use the scientific method with an accompanying scientific attitude and (b) identification of proper laboratory technics. Differences were in favor of the inductive group and the null hypotheses were rejected.

The findings from the retention examinations covering the applications and scientific method and attitude objectives showed differences in mean scores on the examinations in favor of the inductive group of about the same magnitude as those for the retest. These differences were not found to be significant. This was probably caused by the fact that the number of students involved in the retention examination groups were reduced to approximately one-half by graduation thereby requiring much larger differences for significance than were found because of a reduction in the number of degrees of freedom.

The analysis of the data resulting from the addition of control groups from out in the state indicated an advantage in favor of the class using the inductive method over one of the two classes using the deductive method for each of the objectives:

1. Acquisition of facts and principles of chemistry.
2. Ability to apply facts and principles to new situations.

The class using the inductive method was found superior to all three outside control classes using a deductive approach for the scientific method and attitude objective. All the above differences were significant at the 1 percent level.

The mean achievement of the University High School control group using the deductive method was superior (1 percent level of significance) to an outside control group with respect to acquisition of facts and principles and knowledge of and ability to use the scientific method with an accompanying scientific attitude. On the latter objective, the control group was superior to two outside control groups at the 5 percent level of significance.

A challenging and undeveloped phase of laboratory work, that in Grade IX general science, was the basis of a study by Sarris (20). His investigation was designed to determine the principles and experiments of biological and physical science found in four Grade IX textbooks of general science and the defensible assignment to these principles of the experiments, the performance of which should help pupils of Grade IX to develop an understanding of these principles.

Lists of principles developed by earlier workers in the field served as criteria for the relation of the laboratory work to the content of the textbooks.

In the four textbooks examined it was found that 62.71 percent of the principles were in physical science, 37.28 percent were in biological science. However, the experiments proposed were in an eight to one ratio in favor of the physical science. The investigator concluded that many of the experiments are useless and should be eliminated.

The qualities of demonstrations and apparatus involved have been studied at some length. Qualities of the apparatus used were the subject of a survey study by Mark (14).

The investigator attempted to bring together from the literature a composite of the statements of writers as to the desirable qualities in demonstration apparatus. The literature of a period of approximately 25 years was used. The quality of the literature cited varied from validated criteria to expressions of judgment of individuals. In preparing the checklist presented the author cites 27 references; the bibliography includes 22 books and 31 journal articles.

The investigation is of such nature as to lend itself with difficulty to statistical treatment. The effort to weight the various factors involved is commendable.

Bibliography

1. Anderson, Kenneth E. "Adjuncts to Science Instruction." *School Science and Mathematics* 49: 475-76; June 1949.
2. Boeck, Clarence Harry. *The Inductive Compared to the Deductive Approach to Teaching Secondary School Chemistry.* Doctor's thesis. Minneapolis: University of Minnesota, 1950. 254 p.
3. Boer, Helen E. "Using Visual-Sensory Aids in Teaching Science in the Primary Grades." *Science Education* 32: 272-78; October 1948.
4. Carriger, Edward; Lubold, William; and Govoni, Laura E. *An Evaluation of Business-Sponsored Teaching Material.* Master's thesis. Boston: Boston University, 1950. 18 p. (Typewritten)
5. Forbes, William C. *The Laboratory Experience in Science for General Education.* Ed.D. project report. New York: Teachers College, Columbia University, 1949. 289 p. (Typewritten)
6. Greenlee, Julian Marion. "A Source Book of Science Experiences for the Use of Teachers of Young Children." *Teachers College Record,* 52: 124; November 1950.
7. Hubler, Clark. "Teaching Materials for Elementary School Science," *Science Education* 34: 218-24; October 1950.
8. Johnson, Philip G. *The Teaching of Science in Public High Schools.* U. S. Office of Education Bulletin 1950, No. 9. Washington, D. C.: Superintendent of Documents, Government Printing Office, 1950. 40 p.
9. Mallinson, George G. "Narration in Films for Science." *Science Teacher* 17: 220-21; December 1950.
10. Mallinson, George G.; Sturm, Harold E.; and Mallinson, Lois M. "The Reading Difficulty of Textbooks for High-School Biology." *American Biology Teacher* 12: 151-56; November 1950.
11. Mallinson, George G.; Sturm, Harold E.; and Mallinson, Lois M. "The Reading Difficulty of Textbooks in Junior High School Science." *School Review* 58: 536-40; December 1950.
12. Malter, Morton S. "The Ability of Children To Read Cross-Sections." *Journal of Educational Psychology* 38: 157-66; March 1947.
13. Malter, Morton S. "The Ability of Children To Read a Process-Diagram." *Journal of Educational Psychology* 38: 290-98; May 1947.
14. Mark, Joseph A. "Desirable Qualities in Demonstration Apparatus." *School Science and Mathematics* 50: 19-31; January 1950.
15. National Science Teachers Association, Advisory Council on Industry-Science Teaching Relations. *How Science Teachers Use Business-Sponsored Teaching Aids.* Washington, D. C.: the Association, 1950. 35 p.
16. Neal, Nathan A. *A Plan for a Series of Junior High School Science Textbooks.* Ed.D. project report. New York: Teachers College, Columbia University, 1950. 90 p. (Typewritten)
17. Read, John G. "The Science Content of Basic Readers." *Science Education* 32: 279-83; October 1948.
18. Royal, Mary Patricia. *An Analysis of Filmstrips for Junior High School General Science in Terms of Their Inclusion of Scientific Principles, Scientific Method, and Scientific Attitudes.* Master's thesis. Boston: Boston University, 1950. 92 p. (Typewritten)
19. St. Lawrence, Francis James. "The Use of Teaching Aids in Biology Textbooks." *Teachers College Record,* 52; 194-95; December 1950.
20. Sarris, Christos Theodore. *A Determination of the Principles and Experiments of Physical and Biological Science Found in Four Ninth-Grade Textbooks of General Science.* Master's thesis. Boston: Boston University, 1950. 100 p. (Typewritten)
21. Sinclair, Thomas J. *A Report About Business-Sponsored Teaching Aids,* Dansville, N. Y.: F. A. Owen Publishing Co., 1949. 113 p.
22. Smith, Herbert A. "Determination of the Relative Effectiveness of Sound Motion Pictures and Equivalent Teacher Demonstrations in Ninth-Grade General Science." *Science Education* 33: 214-21; April 1949.
23. Wise, Harold E. "Supplementary Contributions of Sound Motion Pictures in High School Biology." *Science Education* 33: 206-13; April 1949.

CHAPTER IV

The Teaching of Mathematics in Grades I thru VIII

ROBERT L. BURCH and HAROLD E. MOSER

Summaries and Bibliographies

IN THE period covered by this review a number of significant summaries, bibliographies, and compilations have appeared. Altho some of these include or refer to articles which are not primarily reports of research, they are included here because of their preeminent usefulness to workers in the field.

Fehr (32), Beatty (5), and Van Engen (95) summarized research in arithmetic and discussed implications of this research for the organization and learning of arithmetic. Beginning in December 1950, Kinsella (52) reported monthly a summary of research in mathematics. Subsequent issues of this journal continue this summary.

Wilson (102) made an extensive revision of an earlier research review. Moser, Kinney, and Purdy (64) surveyed the literature pertaining to the aims and purposes in the teaching of mathematics. Spitzer and Burch (81) reviewed the discussions in the literature which dealt with methods and materials.

Annual annotated bibliographies in arithmetic have been reported in each November issue of the *Elementary School Journal* by Hartung (46). A selected list of references on arithmetic was provided by Van Engen (92).

Compilations of Arithmetic Articles

Part Two of the *Fiftieth Yearbook of the National Society for the Study of Education* is the first yearbook devoted to arithmetic to be published in 10 years. Chapters in this yearbook which are not reported elsewhere include one by Horn (48) which outlines the place and relationship of arithmetic in the total curriculum of the elementary school and three by Swenson (89), Thiele (90), and Van Engen (94), which focus in turn on the arithmetic program in the primary grades, in the middle grades, and in the junior high school. Spitzer (78) wrote a chapter presenting various methods of teaching arithmetic and Buswell (19) examined the teaching of arithmetic in relation to presentday concepts of the psychology of learning. The final chapter is significant for future research because of Buswell's (18) identification of the changing concepts of research and because of the 21 projects for research which were proposed by as many different educators.

Two University of Chicago monographs (15, 17) reported papers read at the 1948 and 1949 conferences on arithmetic. In addition to papers mentioned elsewhere, the 1949 monograph contains a discussion on the use of workbooks by Schneider (76) and another regarding the administration of the arithmetic program by Wingo (104). In the 1949 monograph, Morton (61) identified the place of arithmetic in various types of curriculums, Mott (65) discussed work in the primary grades, Wilburn (99) reported on experiments in self-instruction, Willcutt (100) cited classroom experiences involving pupil participation and Rogers (75) explained the idea of cooperative inservice arithmetic studies.

Studies Evaluating the Meaning Approach

The effect on learning, transfer of training, and retroactive inhibition of three methods of teaching addition facts to second-grade pupils was studied by Swenson (88). The three methods were the *generalization* method with pupil discovery of generalizations, the *drill method* requiring memorization, and the *drill-plus* method with facts organized by sums and use of concrete materials in introducing facts. Each of the 14 classes was subjected to two weeks of readiness preparation, five weeks of training on the first set of addition facts, five and a half weeks on the interpolated set of addition facts, and four weeks on the final set of addition facts. Tests on the facts were administered at five points. Three transfer tests were also given. Significantly higher scores were found for the *generalization* method on the original set of addition facts. This method had an advantage in overcoming retroactive inhibition and promoting transfer. In general, the conclusions are adequately based on the data obtained. However, the inference that organizing facts according to sums is a poor form of organization is open to question. Little attempt was made to utilize the inherent advantages of this organization.

In a study notable for its careful design and thoro execution, Brownell and Moser (10) determined the relative effect of a meaningful versus a mechanical approach when the decomposition method is taught and when the equal-addition method is taught. The study involved 1400 third-grade pupils in 41 schools. The criteria of success included not only measures of rate and accuracy, but also evidence pertaining to smoothness of performance, degree of understanding, extent of retention, competence in transferring to new skills, and the values which accrue when a crutch is used. The data provided by tests, interviews, and teachers' diaries revealed that: (a) decomposition taught meaningfully was the most successful method; (b) the equal addition method was difficult to rationalize; (c) when the teaching was mechanical, the equal addition method had some advantage; (d) the crutch was helpful when teaching the decomposition method and was discarded when teachers guided pupils away from it later; (e) pupils who had been taught meaningfully retained the learning longer and were better able to transfer this learning; and (f) the most economical route to speedy and accurate computation was thru the use of rational procedures. This study emphasized that when methods are being compared, the extent of rationalization may well determine which method has the advantage.

To evaluate teaching which emphasized understanding and generalization (field theory) as contrasted to teaching which emphasized discreteness of elements of knowledge and skill (connectionist theory) Anderson (2) conducted an experiment which involved the year's work of fourth-grade classes in 18 schools. No specific prescription was made concerning objectives, content, or day-by-day procedures, but logs were kept by teachers and the differences in progress were found to be unimportant. The analysis of data from standardized tests indicated that neither method held a significant advantage in the learning of computation and problem solving. For the development of mathematical thinking as measured by a special test there was evidence that for pupils with below-average ability but above-average achievement, there was some advantage in the drill approach. The approach emphasizing understanding and generalization, however, seemed to be advantageous for those with a high level of ability but low achievement—and remedial pupils frequently are in this classification.

Howard (49) compared three methods of teaching fractions to 15 classes of children in Grades V and VI. These methods included: (a) a typical drill method, (b) a method which emphasized the "why" of each step with the practice incorporated in problems, and (c) a method comparable to (b) but which also provided computational practice like that in method (a). At the close of the 16-week teaching period, the advantage for one group resided in the drill approach but no one of the methods held an advantage for the other groups. However, a retention test in September indicated a high rate of loss for drill-trained pupils, a smaller loss for those who had been guided to understand, and for the pupils with both meaning and practice, there was very little loss. Some members of this last group actually had higher scores than in the spring testing.

Under Alkire's (1) direction, one class studied the meanings and relationships underlying the reciprocal technic when the divisor is a fraction while another class memorized the inversion rule and practiced its application. At the close of the teaching period the experimental group had a lower level of achievement than those who had memorized the rule. A retention test five months later indicated, however, that the experimental class had only slightly lower scores and that the group who had memorized a mechanical procedure suffered a high rate of loss. This study, tho small, provided another bit of evidence of a pattern that seems to be evolving from studies involving meanings: (a) at the end of experiments the approach which emphasizes understanding does not always seem to have an advantage over an approach involving only memorization of a mechanical procedure; (b) when retention is measured after a considerable time, the advantage of the meaning approach is revealed, for the learning seems to be more durable.

Discussions on Meaning

According to Hendrix (47) the child acquires a concept when a subverbal, organic, dynamic state of awareness has been achieved. Meaning, according to her, is learning the symbol which stands for the previously-achieved concept. Van Engen (93), in an erudite discussion of meaning, brought out the idea that meaning must come from having the child see action and perform the act himself prior to presentation of the symbol which represents the act. His analysis of meaning was focused on those meanings which are operational in nature rather than syntactical. Weaver (96) pointed out that sometimes it is better not to use representative materials of any kind in developing meanings. An overview of the modern arithmetic program which emphasizes meanings was presented by Burch (14). Stern (82) described a method she called Structural Arithmetic, which she believes is more consistent with the inner nature of number than are most of the concrete procedures which teachers use. The role of discovery in the meaningful program was outlined by McSwain (59).

Johnson (51) argued that pupils need to know the process steps before they are presented with the rationale. He listed three types of meanings: (a) structural meanings, (b) functional meanings, and (c) rationalization of processes.

Fawcett (30) listed number, measurement, relationship, proof, operation, and symbolism as concepts which unify mathematics and which grow in meaning and significance as mathematics is studied.

Wheat (98) dealt with the nature of learning activities in arithmetic and their sequence as determined by the relationships which are inherent in a decimal number system.

A presentation of several fundamental issues in the teaching of arithmetic was made by Clark (22). In order to bring more light to bear on the important issue of how to redistribute class time so as to provide a better balanced program of meanings and drill, Hartung (45) called for cooperative research, local tryouts of various time allotments, and more careful over-all planning by individual teachers.

Mental arithmetic, in Boulware's (8) research, involved using the nature of the number system as a basis for performing arithmetic processes. His study traced the development of mental arithmetic and defined its place and value in the modern program.

The Social Aspects of Arithmetic

Buckingham (12) examined the contributions of social institutions and arithmetic to each other and related these contributions to the presentday program. Brueckner (11) cited the social contributions that can be made by arithmetic.

Two studies were concerned with social units as the context within which arithmetic was taught. Five units were used by Passehl (70) as the source of the arithmetic content for teaching the four fundamental operations with decimal fractions as well as the multiplication and division of common fractions. An average of 79 percent of the class mastered at least three-fourths of the steps. Williams (101) used an experience curriculum with nine successive sixth-grade groups. The pupils had average gains of over a year when compared with norms for standardized tests. The investigator reported other values which accrued thru use of this kind of program.

The functional-use theory was stressed by Harding (43) as more consistent with organic processes that involve the whole person in his environment than is the drill approach or the meaning approach.

Arithmetic Textbooks

Eckert (29) analyzed multiplication of fractions in nine textbook series and proposed a program to overcome the inadequacies which were revealed. After analyzing 10 series of textbooks Conrad (23) found that ambiguities in wordage, discrepancies in fact, inconsistencies, and incomplete source materials accounted for 65 percent of the sources of errors and confusion. Dreier (28) noted that less than 10 percent of the pictures and less than 4 percent of the problems in six third-grade textbooks had a rural setting.

Thru a comparative analysis of older and more recent arithmetic textbooks Boynton (9) presented objective evidence to show that recent textbooks provide (a) a greater use of the group idea for number, (b) a more systematic use of component parts, (c) a slight improvement in the use of the ratio idea, (d) a more frequent use of the series idea in multiplication, and (e) a more extensive utilization of tables for discovery of relationships.

By observational technics and questionnaires, Hamilton (42) studied the usage of arithmetic textbooks in 50 elementary classrooms. She found that 86 percent of the teachers followed textbook procedure and that these teachers consistently preferred the "best theory method" of teaching arithmetic—a theory which represented a compilation of the best features of methods as set forth in the literature on teaching arithmetic.

Readiness

The number of experiences confronting 12 three-year-old children were observed by Clark (21) during morning school sessions for four weeks. Terms of position and indefinite comparison were best understood, and these seemed usually to occur in relation to the child himself. Considerable confusion existed in reference to counting, time, pupil age, and number concepts of 2 and 3. MacLatchy (58) described various technics she had designed to be used in determining the familiarity of preschool children with measurement.

To determine the relative achievement in arithmetic of kindergarten pupils who were subjected to a planned program of number experiences with matched pupils who did not have such a program, Koenker (53) used two kindergartens which had double sessions. Each teacher used one of her groups for an experimental section and the other for a control section so the quality of teaching as a variable was better controlled than is usually the case. When tested in May, the 27 experimental pupils had a mean score of 23.44 (a gain of 10.22) and the control pupils had a mean score of 18.74 (a gain of 5.15). Six of the pupils who had the planned arithmetic program held an advantage of 10 or more score points over their respective matches in the control group. In another publication, Koenker (54) reviewed the research relative to the value of a systematic program for primary-grade children and proposed a program for kindergarten and Grade I.

Beltramo (6) identified nine skills which are important in the process of counting and then listed poems and stories which are useful in teaching these various skills.

The value of meaningful number experiences in promoting arithmetic readiness was discussed by Moser (62).

The Process of Division

Two discussions of division with two-figure divisors favored the apparent method of estimating the quotient figure over the increase-by-one method. Moser (63) found that college freshmen using the apparent method were just as accurate as those who utilized the increase-by-one method. Then, using the problems of teaching rather than statistical analysis as his basis, he presented cogent arguments which led to the conclusion that the apparent method was a better approach for children who are learning to estimate quotient figures. Osburn (69) utilized a statistical approach which took advantage of the fact that the data could be ranged in a dichotomized classification. His analysis revealed clearly that frequently the increase procedure was unnecessary and was sometimes harmful. Thus, the increase-by-one method was found to have less of a statistical advantage than has been reported in some analyses.

Fuller's (33) control group used the increase-by-one procedure for finding quotient figures while the experimental pupils were required to work out a table of multiples of the divisor to nine times the divisor, as a source for quotient figures. Differences favoring this experimental approach were found in his final experiment but these differences were not significant. The pupils, however, liked the table approach and understood it quickly altho they were slower than the pupils who used the increase-by-one procedure.

Smith (77) illustrated what could be done at each grade level, beginning with Grade I, in order to build carefully the concepts and relationships that are needed for understanding the process of division.

Step-by-step spiral development in division was shown on a chart by Gates (34) to illustrate her discussion of the use of this plan of organizing arithmetic work.

Problem Solving

Cronbach (24) discussed various suggestions for the problem-solving program in arithmetic and noted the psychological difficulties that are likely to be encountered.

Thru testing and oral interviewing, Burch (13) evaluated problem tests which require pupils to respond to analytical steps (What is given? What is to be found? What is the estimated answer? How is the problem to be solved?) prior actually to solving each problem. He found that the pupils tended to score higher in problem-solving in the test that did not require response to the analytic steps and that even when pupils had been taught to use the steps, they did not do so except under compulsion. Welch (97) obtained data which indicated that problems expressing social situations in life were not solved with any greater success than were "unreal" problems, and that pupils actually tended to prefer the problems which were unrelated to life situations. Sutherland (87), after analyzing 15,000 verbal problems, discovered four basic thought patterns requiring the process of addition, 10 involving subtraction, eight for multiplication, and 16 for division. Hartung (44) discussed progress in the teaching of problem-solving.

Evaluation

Peters (71), tracing in detail the development of evaluation in arithmetic noted that after 1930 testing instruments became more inclusive. Evaluation procedures, according to her, are still far behind recognized needs which have been pointed out in discussion of authorities.

In constructively criticizing presentday testing, Spitzer (79) indicated that tests too often have the same form and language as that used in instruction, and that they overemphasize exact computation. He then suggested several excellent variations to use in evaluating pupil progress. In another article Spitzer (80) surveyed presentday testing instruments and practices and then made 10 suggestions for improvement. Glennon (36), as a prelude to a report of a study which used a test designed to measure understanding cited six reasons why tests of meaningful content have been slow in developing. A detailed presentation of evaluation in arithmetic was made by Sueltz (84) and illustrations of newer methods of testing were provided. Storm (83) presented an extensive list of meanings which he felt should be tested.

Buswell (16) suggested that evaluation of pupils' thought processes provides needed insight into the extent to which these pupils understand the concepts and procedures. He described six methods for obtaining evidence of pupils' thought procedures.

Multisensory Aids

Grossnickle (38) was responsible for an earlier over-all view of multisensory aids and, somewhat later, he and Metzner (40) wrote a three-chapter volume in which they discussed (a) the place of visual aids in a meaningful program in arithmetic, (b) ways in which this kind of aid can be used, and (c) sources from which audio-visual aids may be obtained. Grossnickle also joined with Junge and Metzner (39) to produce an extensive and useful chapter concerned with instructional materials and manipulative aids.

Motyka (66) provided a review of learning aids and Lazar (55) presented in detail the use of a device for teaching concepts and operations relating to integers and fractions.

Individual Differences

Ramharter and Johnson (73) found that high achievers were superior to low achievers in accuracy, correcting errors quickly, retention, and study technics.

Grime (37) in discussing the 14 level division of the Cleveland primary-grades course of study in arithmetic, indicated the various ways in which such a program makes provision for individual differences in the teaching of arithmetic.

By matching a group of mentally retarded children with a group who were chronologically younger but had the same mental ages, Cruickshank (25) was able to isolate variations in ability for these two groups. He found that when problems had extraneous material and when the problems had no numbers, the mentally retarded pupils were much more confused than the normal pupils with like mental ages.

The number abilities of bilingual Mexican-American children in Grade I was found by Rhue (74) to be inferior to those of children of a comparable Anglo-American group. A study by Plank (72), while relatively unsystematic, suggests possibilities for research dealing with factors in personality structure and mathematics background that lead to failure. MacLatchy (57) found that creative thinking may actually lead to errors.

Preferences of Children

Chase (20) reported a large scale study of subject preferences of 13,383 fifth-grade children in New England, and 2350 fifth-grade children in a southwestern city. This study revealed that reading and arithmetic were the two leading subjects in children's preferences, and that arithmetic was the very definite preference of the teachers.

In Dean's (26) study, the children with higher achievement in arithmetic tend to list arithmetic as their first preference and those who prefer arithmetic tend to have a higher level of achievement in arithmetic.

Miscellaneous

Fay (31) determined abilities of sixth-grade pupils in certain specific reading skills. When chronological and mental ages were controlled, he found that those who were superior in the reading skills had no higher achievement in arithmetic than those who were inferior.

Bernadetta (7) discussed a four-point plan which she felt was important in connection with the completion of any unit in arithmetic.

In order to study the possibility of predicting future arithmetic achievement from measurement of pupil performance in Grade I, Olander and others (68) constructed two arithmetic scales. The first measured quantitative information and the second evaluated the ability of pupils to perceive relationship. Three years after administering the arithmetic scales, 289 of the pupils who took the first-grade arithmetic tests were again tested. When the evaluations of the first-grade tests were correlated with the problem-solving section of the Unit Scale of Attainment, a correlation of .55 was obtained. The correlation for fundamental operations was .51. This extent of correlation with arithmetic provides an efficiency of prediction of about 15 percent over prediction by guessing.

In order to determine whether teachers' judgments agree with research and expert opinion, LeBaron (56) had 22 teachers respond to a questionnaire containing 72 declarative statements taken from research or authoritative sources. On the average there was about 50 percent agreement between teachers' opinion and the statements that were included in the study. Glennon (35) reported on a program of cooperative research which was carried out by supervisors and teachers in the central section of New York state. Trimble (91) illustrated ways in which the concept of the fraction as a ratio may be developed concretely so that real meaning is attained.

Mathematics in Grades VII and VIII

Interest of researchers at the junior high-school level traditionally has been preoccupied with discovering and analyzing computational deficiencies of pupils. Research studies reported for the three-year period ending April 1, 1951 follow the same general pattern but with a difference. The studies currently reported are concerned as much with meanings, judgments, and functional applications of arithmetic as with the purely computational aspects. Undoubtedly this broader frame of reference reflects in part the spirit and influence of such writings as the "Second Report of the Commission on Post-War Plans" (67).

Arthur (3) prepared a test to see which of the essentials proposed by the Committee on Essential Mathematics for Minimum Army Needs (1943) required further attention in high school. He found that freshmen entering high school three and four years after the publication of the report did not have adequate understanding of, or the ability to work many of the problems considered essential. Much specificity in learning was revealed by the test. Important difficulties with decimals and percents were also found. Arthur concluded that remedial teaching at the high-school level is necessary to meet the essentials listed by the committee.

A study by Montgomery (60) supplements nicely the findings of Arthur. Montgomery investigated the ability of seventh-grade pupils to use decimals, fractions, and percents interchangeably and with understanding.

The scope of the problem was confined to "Case II" relationships. A special test was designed to measure the degree of understanding as well as facility in abstract computation. These tests were given to 624 pupils in Grade VII. Results showed that children could not use all three forms with equal facility. Comparisons yielding values greater than unity, or 100 percent, were especially troublesome.

When the population was divided into high, middle, and low thirds it was found that the high third could use all three forms with about equal ease. The middle third could use common fractions with more facility than either of the other forms, and the common fraction form was much preferred by pupils in the lowest third.

Montgomery pointed out the need for reducing specificity in learning by a more meaningful approach to the interrelationships between decimals, fractions and percents. Much more attention needs to be given to fractions as ratios. He also pointed out the inadequacy of current test instruments for measuring these interrelationships.

Sueltz and Benedick (86) called attention to the fact that the capacity to use arithmetic functionally means more than ability to compute. They constructed a test to measure understandings and judgments as well as computation and problem-solving. The results from testing 2000 sixth-graders in three eastern states revealed glaring weaknesses in all four areas. The tests were repeated in Grade IX and in the senior high school with approximately the same conclusions. The authors found that competence in functional arithmetic falls beyond the sixth-grade level. Furthermore, the present program of mathematics at the junior and senior high-school levels is not adequate to overcome the shortcomings and deficiencies revealed by the tests in Grade VI. The secondary schools should spend less time redoing or improving the work of the elementary schools and make arithmetic an integral part of their program.

Glennon (36) reported pioneer research with an instrument for measuring growth in understandings and meanings in arithmetic. He constructed a multiple choice test of 80 items covering five areas of meanings and understandings basic to the computational processes taught in Grades I thru VI. The test was validated in part on the basis of combined judgments of 16 experts in subjectmatter and in part by observations of its ability to distinguish between pupils who understood the meanings and those who did not. The test was administered to 1139 subjects at seven levels: Grades VII, VIII, IX, XII, teachers-college freshmen, college seniors and inservice teachers.

No significant difference in achievement of basic mathematical understandings between seventh- and eighth-graders was found. Ninth-graders, however, were found to be significantly superior to eighth-graders. One may question the educational significance of this difference without challenging the statistical conclusion. The mean score in percent of items correct was 14.01 for Grade VIII and 18.02 for Grade IX. In an 80-item test the difference in means would amount to 3.2 items which is hardly an educational accomplishment of any magnitude to show for one additional year of work. According to Glennon, the test revealed the meager degree with which teachers are succeeding in bringing about meanings and understandings.

Taken together, the studies of Arthur, Montgomery, Glennon, and Sueltz and Benedick seem to indicate an amazing sterility in mathematical accomplishment at Grade VII and Grade VIII levels. A reexamination of content and reevaluation of procedures for correcting these deficiencies is called for.

Sueltz (85) raised important questions concerning the use of research in curriculum construction. The following are of general interest: Is it possible to test and evaluate all the important goals in arithmetic? Can the results of piece-meal researches be summarized into a large or total pattern? Is current research thoroly reliable, or do method, point of view and incentives limit research results to the original experiment?

Johnson (50) reported a study in which he attempted to identify some of the intellectual factors most closely related to the ability to solve verbal problems in arithmetic. His study, made at the eighth-grade level, found the greatest relationship between problem-solving and general vocabulary. The correlation ratios obtained ranged from .45 to .51. The factor showing the second closest relationship to problem-solving was reasoning (.37 to .47). A surprising discovery revealed that when problem scales without numbers were used in place of the regular problem scales the order of relationship was reversed, i.e., correlation ratios for reasoning were higher than the correlations with vocabulary.

Bibliography

1. ALKIRE, E. RUSSELL. *An Experimental Study of the Value of a Meaningful Approach to the Operation of Division with Common Fractions.* Master's thesis. Claremont, Calif.: Claremont College, 1949. 211 p. (Typewritten)
2. ANDERSON, G. LESTER. "Quantitative Thinking As Developed Under Connectionist and Field Theories of Learning." *Learning Theory in School Situations.* University of Minnesota Studies in Education No. 2. Minneapolis: University of Minnesota Press, 1949. p. 40-73.
3. ARTHUR, LEE E. "Diagnosis of Desirabilities in Arithmetic Essentials." *Mathematics Teacher* 43: 197-202; May 1950.
4. ASSOCIATION FOR CHILDHOOD EDUCATION INTERNATIONAL. "Using What We Know About Children in Teaching Arithmetic." *Childhood Education* 26: 242-91: February 1950.
5. BEATTY, MRS. LESLIE S. "Re-Orienting to the Teaching of Arithmetic." *Childhood Education* 26: 272-78; February 1950.
6. BELTRAMO, LOUISE. *Sources and Suggested Uses of Poems and Stories Involving Counting Situations.* Master's thesis. Iowa City: State University of Iowa, 1949. (Typewritten)
7. BERNADETTA, SISTER MARY. "An Elementary Supervisor Looks at Arithmetic." *School Science and Mathematics* 50: 445-53; June 1950.
8. BOULWARE, C. ELWOOD. *The Emerging Concept of Mental Arithmetic.* Doctor's thesis. New York: Teachers College, Columbia University, 1950. 158 p. (Typewritten)
9. BOYNTON, HOLMES. *The Development of Number Meanings in Successive Editions of Recent Third-Grade Arithmetic Texts.* Doctor's thesis. New York: Teachers College, Columbia University, 1948. 122 p. (Typewritten)
10. BROWNWELL, WILLIAM A., and MOSER, HAROLD E. *Meaningful versus Mechani-*

cal Learning. Duke University Research Studies in Education, No. 8. Durham, N. C.: Duke University Press, 1949. 207 p.

11. Brueckner, Leo J. "The Social Contributions of Arithmetic." *National Elementary Principal* 30: 7-10; October 1950.
12. Buckingham, Burdette R. "The Social Point of View in Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 269-81.
13. Burch, Robert L. *An Evaluation of Analytic Testing in Arithmetic Problem Solving.* Doctor's thesis. Durham, N. C.: Duke University, 1949. 145 p. (Typewritten)
14. Burch, Robert L. "Skills Instruction in Arithmetic." *National Elementary Principal* 29: 25-33; December 1949.
15. Buswell, Guy T., editor. *Arithmetic 1948.* Supplementary Educational Monographs, No. 66. Chicago: University of Chicago Press, 1948. 90 p.
16. Buswell, Guy T. "Methods of Studying Pupils' Thinking in Arithmetic." *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. p. 55-63.
17. Buswell, Guy T., and Hartung, Maurice L., editors. *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. 100 p.
18. Buswell, Guy T. "Needed Research on Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 282-98.
19. Buswell, Guy T. "The Psychology of Learning in Relation to the Teaching of Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II. National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 143-54.
20. Chase, W. Linwood. "Subject Preferences of Fifth-Grade Children." *Elementary School Journal* 50: 204-11; December 1949.
21. Clark, Eileen. "Number Experiences of Three-Year-Olds." *Childhood Education* 26: 247-50; February 1950.
22. Clark, John R. "Issues in Teaching Arithmetic." *Teachers College Record* 52: 205-12; January 1951.
23. Conrad, Bernard Julius. *Possible Sources of Error and Conflict in Arithmetical Reasoning and Concept Formation in Current Elementary Textbooks.* Master's thesis. Claremont, Calif.: Claremont College, 1949. 189 p. (Typewritten)
24. Cronbach, Lee J. "The Meanings of Problems." *Arithmetic* 1948. Supplementary Educational Monographs, No. 66, Chicago: University of Chicago Press, 1948. p. 32-43.
25. Cruickshank, William M. "Arithmetic Ability of Mentally Retarded Children." *Journal of Educational Research* 42: 161-70, November 1948; 279-88, December 1948.
26. Dean, Stuart E. "Relation of Children's Subject Preferences to Their Achievement." *The Elementary School Journal* 51: 89-92; October 1950.
27. Department of Elementary School Principals. "Arithmetic in the Modern Elementary School." *National Elementary Principal* 30: 1-56; October 1950.
28. Dreier, William H. "Rural Background Found in Six Third-Grade Arithmetic Texts Published Between 1942 and 1946." *Journal of Educational Research* 42: 299-306; December 1948.
29. Eckert, Ethel. *An Analysis of Instructional Provisions in the Multiplication of Common Fractions as Presented in Nine Series of Arithmetic Textbooks.* Master's thesis. Claremont, Calif.: Claremont College, 1948. 87 p. (Typewritten)
30. Fawcett, Harold P. "A Unified and Continuous Program in Mathematics." *School Science and Mathematics* 50: 342-48; May 1950.
31. Fay, Leo C. "The Relationship Between Specific Reading Skill and Selected Areas of Sixth Grade Achievement." *Journal of Educational Research* 43: 541-47; March 1950.
32. Fehr, Howard F. "Present Research in the Teaching of Arithmetic." *Teachers College Record* 52: 11-23; October 1950.
33. Fuller, Kenneth Gary. *An Experimental Study of Two Methods of Long Division.* Teachers College Contributions to Education, No. 951. New York:

Bureau of Publications, Teachers College, Columbia University, 1949. 76 p.

34. GATES, LUCILE B. "Spiral Development of Arithmetic." *School Science and Mathematics* 49: 273-80; April 1949.

35. GLENNON, VINCENT J. "Action Research Changes the Teaching of Arithmetic in Central New York State." *Educational Leadership* 7: 583-84; May 1950.

36. GLENNON, VINCENT J. "Testing Meanings in Arithmetic." *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. p. 64-74.

37. GRIME, HERSCHEL E. "Adapting the Curriculum in Primary Arithmetic to the Abilities of Children." *Mathematics Teacher* 43: 242-44; October 1950.

38. GROSSNICKLE, FOSTER E. "The Use of Multi-Sensory Aids in Developing Arithmetical Meanings." *Arithmetic 1948.* Supplementary Educational Monographs, No. 66. Chicago: University of Chicago Press, 1948. p. 1-14.

39. GROSSNICKLE, FOSTER F.; JUNGE, CHARLOTTE; and METZNER, WILLIAM. "Instructional Materials for Teaching Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 155-85.

40. GROSSNICKLE, FOSTER E., and METZNER, WILLIAM. *Use of Visual Aids in the Teaching of Arithmetic.* Brooklyn: Rambler Press, 1950. 58 p.

41. GROVER, CHARLES C. "The Rate of Progress of Pupils in Arithmetic in the Elementary School." *The Mathematics Teacher* 44: 7-9; January 1951.

42. HAMILTON, JEAN FRANCES. *A Study of Textbook Material in the Field of Arithmetic.* Doctor's thesis. Iowa City: State University of Iowa, 1950. 288 p. (Typewritten)

43. HARDING, LOWRY W. "Developing Number Concepts thru Planned Functional Use." *National Education Association Journal* 40: 199; March 1951.

44. HARTUNG, MAURICE L. "Advances in the Teaching of Problem-Solving." *Arithmetic 1948.* Supplementary Educational Monographs, No. 66. Chicago: University of Chicago Press, 1948. p. 44-53.

45. HARTUNG, MAURICE L. "Major Instructional Problems in Arithmetic in the Middle Grades." *Elementary School Journal* 50: 86-91; October 1949.

46. HARTUNG, MAURICE L. Selected References on Elementary School Instruction. *Elementary School Journal* 49: 168-70, November 1948; 50: 165-67; November 1949; 51: 157-59; November 1950.

47. HENDRIX, GERTRUDE. "Prerequisite to Meaning." *The Mathematics Teacher* 43: 334-39; November 1950.

48. HORN, ERNEST. "Arithmetic in the Elementary-School Curriculum." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 6-21.

49. HOWARD, CHARLES F. "Three Methods of Teaching Arithmetic." *California Journal of Educational Research* 1: 3-7; January 1950.

50. JOHNSON, JOHN T. "On the Nature of Problem Solving in Arithmetic." *Journal of Educational Research* 43: 110-15; October 1949.

51. JOHNSON, JOHN T. "What Do We Mean by Meaning in Arithmetic?" *The Mathematics Teacher* 41: 362-67; December 1948.

52. KINSELLA, JOHN J., editor. "Research in Mathematics Education." *The Mathematics Teacher* 43: 410-13; December 1950.

53. KOENKER, ROBERT H. "Arithmetic Readiness at the Kindergarten Level." *Journal of Educational Research* 42: 218-23; November 1948.

54. KOENKER, ROBERT H. "Arithmetic Readiness for the Primary Grades." *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. p. 26-34.

55. LAZAR, NATHAN. "A Device for Teaching Concepts and Operations Relating to Integers and Fractions." *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. p. 87-100.

56. LEBARON, WALTER A. "Study of Teachers' Opinions in Methods of Teaching Arithmetic in the Elementary School." *Journal of Educational Research* 43: 1-9; September 1949.

57. MACLATCHY, JOSEPHINE H. "Child's Thinking as a Source of Error." *Educational Research Bulletin* 27: 113-20; May 1948.

58. MACLATCHY, JOSEPHINE H. "A Test of the Pre-School Child's Familiarity with Measurement." *Educational Research Bulletin* 29: 207-208; 222-23; November 1950.

59. McSwain, Eldridge T. "Discovering Meanings in Arithmetic." *Childhood Education* 26: 267-71; February 1950.

60. Montgomery, John F. *An Investigation of "Case II" Relationship in Arithmetic.* Doctor's thesis. Durham, N. C.: Duke University, 1950. 177 p. (Typewritten)

61. Morton, Robert Lee. "The Place of Arithmetic in Various Types of Elementary School Curriculums." *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. p. 1-20.

62. Moser, Harold E. "Advancing Arithmetic Readiness Through Meaningful Number Experience." *Childhood Education* 24: 322-26; March 1948.

63. Moser, Harold E. "Two Procedures for Estimating Quotient Figures When Dividing by Two Place Numbers." *Elementary School Journal* 49: 516-22; May-June, 1949.

64. Moser, Harold E.; Kinney, Lucien; and Purdy, Charles. "Aims and Purposes in the Teaching of Mathematics." *Review of Educational Research* 18: 315-22; October 1948.

65. Mott, Sina M. "Letting Arithmetic Function in the Primary Grades." *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. p. 21-25.

66. Motyka, Agnes L. "Learning Aids in Arithmetic." *The National Elementary Principal* 30: 34-41; October 1950.

67. National Council Teachers of Mathematics. "Second Report of the Commission on Post-War Plans." *The Mathematics Teacher* 38: 191-221; May 1945.

68. Olander, Herbert T.; Van Wagenen, M. J.; and Bishop, Helen Miriam. "Predicting Arithmetic Achievement." *Journal of Educational Research* 43: 66-73; September 1949.

69. Osburn, Worth J. "Division by Dichotomy as Applied to the Estimation of Quotient Figures." *Elementary School Journal* 50: 326-30; February 1950.

70. Passehl, George. "Teaching Arithmetic Through Activity Units." *Peabody Journal of Education* 27: 148-52; November 1949.

71. Peters, Ann C. *A Survey of the Development of Evaluation in Arithmetical Learnings.* Doctor's thesis. New York: Teachers College, Columbia University, 1948. 365 p. (Typewritten)

72. Plank, Emma N. "Observations on Attitudes of Young Children Toward Mathematics." *Mathematics Teacher* 43: 252-63; October 1950.

73. Ramharter, Hazel K., and Johnson, Harry C. "Methods of Attack Used by 'Good' and 'Poor' Achievers in Attempting to Correct Errors in Six Types of Subtraction Involving Fractions." *Journal of Educational Research* 42: 586-97; April 1949.

74. Rhue, Sara Ann. *An Investigation of the Number Abilities of a Group of Bilingual Mexican-American Children in Grade One.* Doctor's thesis. Iowa City: State University of Iowa, 1950. 84 p. (Typewritten)

75. Rogers, Don C. "Co-operative In-service Studies of Arithmetic." *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. p. 75-79.

76. Schneider, Helen A. "The Place of Workbooks in the Teaching of Arithmetic." *Arithmetic 1948.* Supplementary Educational Monographs, No. 66. Chicago: University of Chicago Press, 1948. p. 54-67.

77. Smith, Rolland R. "Meaningful Division." *Mathematics Teacher* 43: 12-18; January 1950.

78. Spitzer, Herbert F. "Learning and Teaching Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 120-42.

79. Spitzer, Herbert F. "Procedures and Techniques for Evaluating Outcomes of Instruction in Arithmetic." *Elementary School Journal* 49: 21-31; September 1948.

80. Spitzer, Herbert F. "Testing Instruments and Practices in Relation to Present Concepts of Teaching Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 186-202.

81. Spitzer, Herbert F., and Burch, Robert L. "Methods and Materials in the

Teaching of Mathematics." *Review of Educational Research* 18: 337-49; October 1948.

82. Stern, Catherine. "Natural Way to Numbers." *Journal of Education* 132: 248-50; December 1949.

83. Storm, W. B. "Arithmetical Meanings That Should Be Tested." *Arithmetic 1948*. Supplementary Educational Monographs, No. 66. Chicago: University of Chicago Press, 1948. p. 26-31.

84. Sueltz, Ben A. "Evaluation of Arithmetic Learnings." *The National Elementary Principal* 30: 24-33; October 1950.

85. Sueltz, Ben A. "Important Issues in Arithmetic." *Mathematics Teacher* 42: 197-99; April 1949.

86. Sueltz, Ben A., and Benedick, John W. "The Need for Extending Arithmetic Learnings." *Mathematics Teacher* 43: 69-73; February 1950.

87. Sutherland, Ethel. "One-step Problem Patterns and Their Relation to Problem Solving in Arithmetic." *Teachers College Record* 49: 492; April 1948.

88. Swenson, Esther J., and others. "Organization and Generalization As Factors in Learning, Transfer, and Retroactive Inhibition." *Learning Theory for School Situations.* University of Minnesota, Studies in Education, No. 2. Minneapolis: University of Minnesota Press, 1949. p. 9-39.

89. Swenson, Esther J. "Arithmetic for Preschool and Primary-Grade Children." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II. National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 53-75.

90. Thiele, C. Louis. "Arithmetic in the Middle Grades." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 76-102.

91. Trimble, Harold C. "Fractions Are Ratios, Too." *Elementary School Journal* 49: 285-91; January 1949.

92. Van Engen, Henry. "A Selected List of References on Elementary School Arithmetic." *Mathematics Teacher* 43: 168-71; April 1950.

93. Van Engen, Henry. "An Analysis of Meaning in Arithmetic." *Elementary School Journal* 49: 321-29; February; 395-400, March 1949.

94. Van Engen, Henry. "Arithmetic in the Junior-Senior High School." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 103-19.

95. Van Engen, Henry. "Summary of Research and Investigations and Their Implications for the Organization and Learning of Arithmetic." *Mathematics Teacher* 41: 260-65; October 1948.

96. Weaver, J. Fred. "Some Areas of Misunderstanding About Meaning in Arithmetic." *Elementary School Journal* 51: 35-41; September 1950.

97. Welch, Ronald C. *The Relative Merits of Two Types of Arithmetic Problems.* Doctor's thesis. Iowa City: State University of Iowa, 1950. 52 p. (Typewritten)

98. Wheat, Harry G. "The Nature and Sequences of Learning Activities in Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 22-52.

99. Wilburn, D. Banks. "Methods of Self-Instruction for Learning Arithmetic." *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. p. 35-43.

100. Willcutt, Gladys M. "Classroom Experiences with Pupil Participation in Teaching Arithmetic." *Arithmetic 1949.* Supplementary Educational Monographs, No. 70. Chicago: University of Chicago Press, 1949. p. 44-54.

101. Williams, Catherine M. "Arithmetic Learning in an Experience Curriculum." *Educational Research Bulletin* 28: 154-62; September 1949.

102. Wilson, Guy M. "Arithmetic." *Encyclopedia of Educational Research.* New York: Macmillan Co., 1950. p. 44-58.

103. Wilson, Guy M., and Ramey, Alton E., editors. "Arithmetic Functional Problem Unit Number." *Education* 69: 327-85; February 1949.

104. Wingo, G. Max. "The Organization and Administration of the Arithmetic Program in the Elementary School." *Arithmetic 1948.* Supplementary Educational Monographs, No. 66. Chicago: University of Chicago Press, 1948. p. 68-79.

CHAPTER V

The Teaching of Mathematics in High School and College

LUCIEN B. KINNEY, EDWIN EAGLE, and CHARLES PURDY

GENERAL trends in secondary mathematics over the 30-year period from 1918 to 1948 were studied by Wilson (55). He utilized, as his sources, statements of authorities, textbooks, research publications, reports of national committees, and courses of study. He noted trends toward (a) the teaching of meaning and understanding, (b) effective guidance of pupils, (c) increased use of audio-visual aids, (d) greater use of enrichment materials, (e) efforts in many places to organize mathematics effectively and functionally for general education, and (f) attempts to desire and use more critical methods of evaluating the outcomes of instruction and achievement of the learner. This agrees in general with the summary of Schaaf (47) and the Report of the Trends Committee of the Central Association of Science and Mathematics Teachers (24, 25). Research in the field during the period covered in the present report follows rather closely the same lines of emphasis.

Analysis and Formulation of Aims

Studies of aims in mathematics have utilized three approaches: appeal to authority and practice, life needs, and philosophy of education.

Studies of life needs have recognized both the nature of the child and the life situations where number is involved. Kinsella (28) pointed out the characteristics of the adolescent that must be recognized in an instructional program in arithmetic. Several have been in line with the plea of Betz (6) for a complete study of the role of mathematics in the modern world. The contributions of mathematics to general education were analyzed by Breslich (8), Rosskopf (44), Sturm (51), and Gager (16) in order to trace the background of the present general mathematics program and enunciate purposes such as development of the ability to recognize and use quantitative data in the study of social problems, to prepare for citizenship, to develop an appreciation of cultural values, and to meet the daily mathematical needs.

In a more specific curriculum, Kinney (27) examined the evolution of the mathematics curriculum at the New York State Maritime College in terms of the needs of workers in the marine field and made recommendations for a continuing program of improvement. Other studies of this general nature that were parts of more extensive projects in curriculum construction are cited in a later section of the present report.

Various technics have been utilized to formulate aims based on opinions of authorities. Brown (11) polled 700 teachers of secondary geometry to determine the objectives that they held most important. Objectives held most important by students were found by visiting "a few" classrooms and questioning pupils as to purposes. These responses were tabulated and were compared to the textbooks in use. The most important teacher objectives were to develop the habit of clear thinking and precise expression and to give a knowledge of the facts and principles of geometry. The second teacher objective was rated highest by the pupils and the principal teacher objective was not included among the five most prevalent pupil selections. Hlavaty (19) evaluated Grade X mathematics, and 18 current textbooks on the basis of recommendations of national bodies in the field of general education, mathematical instruction, and the teaching of geometry. It was concluded that traditional demonstrative geometry instruction is still prevalent and that it cannot be rationalized in terms of the recommendations. Purdy (41) formulated, on the basis of authority, and validated by means of validation criteria, a set of aims for an experimental course in college general mathematics, and then determined the degree of achievement of those aims in a particular course.

Ibrahim (20) examined philosophies of education for the implications for mathematics curriculum and classroom procedures and contrasted the different philosophies with schools of psychology. He emerged with a preference for pragmatism as a philosophy and organismic psychology.

Content

Wilson (55) pointed out the shifts in content over 30 years in elementary arithmetic, algebra, plane geometry, and general and social mathematics as reflected in textbooks, courses of study, proposals by authorities, research, and committee reports. A few of the shifts identified in that study were to mathematical and social arithmetic, more informational material, fresh applications spaced to maintain skill, organization by units or chapters, large emphasis on applications, use of nongeometric materials in geometry courses, and exercises for development of meanings of mathematical topics.

Current studies have utilized two approaches to improved content—the mathematical meanings needed for understanding, including the rationale of facts and processes; and the specific needs of life activities.

Needed meanings have been analyzed by Van Engen (54) who listed the understandings essential for the ready use of the language of mathematics to be acquired in the junior-senior high school and described methods for their development, and by Fawcett (13) who listed number, measurement, relationship, proof, operation, and symbolism as the "threads by which the program is unified and thru which it is related to other areas of learning." Fawcett subdivided each of his topics into appropriate mathematical skills and understandings.

Gager (16) reported a study of life needs to identify the concepts that should be taught in Grades VII thru XII, as reported by a group of Florida mathematics teachers. These were used as the basis for a "second track" parallel to college preparatory mathematics.

A number of studies have been concerned with the mathematics needed for the study of science. Rich (42) investigated the place of functionality in secondary-school mathematics and the correlation of mathematical and scientific instruction thru functionality. He identified the keys to variable change and functionality as ratios, differences, rates of change, and two-set equations, and traced the application of variation, sense change, rate of change, and power variation to problem-solving. The *Twentieth Yearbook of the National Council of Teachers of Mathematics* (38) presented a comprehensive treatment of uses of the metric system in four main sections: (a) System of Measures—the need, scientific development, and widespread adoption; (b) The System at Work—evaluations and endorsements by users in varied fields of activity; (c) Of Public Interest—publicity given to the metric system thru press, radio, and groups advocating adoption, and (d) Toward Wider Use—methods of making the change both in general use and in education.

Wilson, Carpenter, and Nihard (56) reported the result of an analysis of mathematical needs for skilled trades prepared by the Los Angeles Supervisor of Apprentice Education to determine the kind and extent of mathematics needed by each trade. Sixteen mathematical units including whole numbers, common fractions, decimals, percent, linear measure, geometric rules, tables, graphs, formulas, solving equations for the unknown, slide rule, and trigonometry were identified. All of the 15 trades studied, excepting meat cutting, needed the first 13 units. Electricians, machinists, die makers, pipefitters, and refrigeration mechanics checked the last three also. This report also included a one-page outline showing more specifically the needs of each of the 15 trades in each of these mathematics units. Loflin (33) determined the mathematical facts, formulas, principles, and operations used in undergraduate courses in Chemical Engineering. This study was based upon descriptions of the courses recommended by the American Institute of Chemical Engineers, the catalogs of accredited institutions and the textbooks and periodicals in the field. It was found that many of the topics in the traditional courses of algebra, analytic geometry, trigonometry, and the calculus had no application to Chemical Engineering. This study showed that "only the simplest type of mathematical problems appeared in the applications." Among needs identified for chemical engineers were simple partial fractions, integrals chiefly of the forms $u^n du$ and $\frac{du}{u}$, problem-solving technics, and ability to set up fundamental equations.

Anderson (1) outlined the topics in which applications from aerial navigation may be used to enrich a course of study in junior and senior high-school mathematics, providing a body of professionalized subjectmatter for mathematics classes. This study covered spherical properties of the earth, geometry of position, celestial navigation, measurement and computation with approximate numbers, scale drawings, trigonometry, and functional relations of navigation as they apply to topics proposed by the Joint Commission. Kramer (30) gave the mathematical prerequisites necessary for meteorology, defined a program of mathematics for training meteorologists, and determined implications and source material from meteorology for use by mathematics teachers. This information was gathered by analysis of publications, papers, and curriculums at various schools.

Technics of Teaching

An interesting group of studies have been carried out to determine the comparative effectiveness of classroom practices. Results, in general, were inconclusive.

Michael (36) found no outstanding difference in student gain dependent on teaching technic in comparing an inductive approach with an authoritative, for teaching of signed numbers in Grade IX algebra. Gains in computation skill and generalization ability, and also attitudes toward mathematics, were evaluated for classes with similar prior mathematical instruction and for three ability levels within these classes. Slight differences were noted but none that were significant. In comparison of a technic involving a large measure of individual instruction, student participation, and functionality, with a conventional method in Grade IX algebra classes, Schultz and Ohlsen (48) found significantly greater gains with the individualized instruction in performance as shown by Ohlsen's Test of Mathematics Essentials for the Ordinary Citizen, and in pupil attitudes. Gains in algebra competence, however, were not significantly different. Lewis (32) found a statistically significant difference in critical thinking gain between an experimental group in plane demonstrative geometry and control groups receiving conventional instruction; technics with the experimental group emphasized fundamental concepts of methods employed and applications to nonmathematical situations. Better pupil attitudes and wide functionality were claimed for the experimental course but the amount of geometry learned was not significantly different from that of a comparable control group. In a similar situation involving a smaller divergence of technics, Lueck (34) reported a slight gain in the solving of "word problems" in algebra when emphasis was given to fundamental concepts, along with better pupil response and attitudes.

Purdy (41) undertook to formulate a course in general college mathematics for students who present not more than two years of high-school mathematics credit on admission. They were taking the course either as terminal mathematics, or as preparatory to further work in mathematics. Course activities were designed to impart understanding of essential basic concepts, familiarity with functional topics in mathematics and desirable attitudes, and were carefully evaluated as to effectiveness in each area. Computational and manipulative objectives were achieved and simple vocabulary, symbolism, and concepts were mastered. Other areas showed gains but fell short of desired objectives. Response was irregular in abstract topics. Attitudes varied with degree of mastery attained but were generally satisfactory.

Furst (15) examined two groups of highly selected eleventh- and twelfth-grade students under contrasting curriculums to determine terminal ability to relate various reactions in adjusting to or solving problems. One group pursued a program of study in a conventional curriculum while in the other group objectives were primarily emphasized and "radically different" methods of instruction were employed. Conclusions were drawn from analyses of initial and final test data covering 27 areas of learning, of which four were mathematical. He found that both groups tended to organize their learning on a subjectmatter basis in much the same form of organization as the learning experiences had been presented and that there was little consistency in achievement outcomes from a given type of activity among the various subject fields.

Johnson (22, 23) examined the effectiveness of films and filmstrips in teaching plane geometry. Selectivity, both in the visual aids employed and the participating groups, was avoided. He found for one instructional unit that use of both films and filmstrips resulted in additional gains statistically significant. Used alone, filmstrips were judged to be superior to films. No conclusive advantage over conventional instruction was demonstrated and in one item tested conventional instruction appeared superior. Johnson and Syer (21) have compiled an extensive bibliography of films and filmstrips intended for use at the high-school level and listed them by subject and appropriate grade.

Sueltz (52) studied the retention by college freshmen of their mathematical understanding and judgment. Scores on the tests were compared to those of junior high-school pupils on the same test.

He concluded that: (a) pupils at all levels tended to learn those things that the teachers expected of them and to learn in a pattern set by the teacher; (b) weaknesses tended to persist from one level to another, particularly arithmetic learnings; (c) certain types of exercises in which the mathematical element was not complicated and which were found in situations where older students had experience proved easier for the older group; (d) the extension of learnings in arithmetic was neglected in the typical secondary-school program; (e) schools tended to place too much dependence on "paper and pencil" work; (f) confusion concerning the purpose of study and the values to be derived from the study of demonstrative geometry persisted in the minds of the students. In the recognition of geometric figures and concepts and in the application of many geometric principles, those students, who studied the informal and experimental type of geometry found in many junior high schools, tended to do as well as many students who spent a whole year at demonstrative geometry; and, (g) students tended to do comparatively well in abstract manipulative algebra but tended to be too little concerned with understanding the significance of what they were doing.

Guidance, Diagnosis, and Remedial Instruction

The importance of counseling in the secondary mathematics program is generally recognized. A survey by Sanford (45) emphasized the need for more counseling. He found that, in the state of Illinois, most pupils enrol in science and mathematics courses in Grades IX and X but relatively few continued thru Grades XI and XII. Increased cooperation of other teachers, pupils, and laymen was proposed to meet more adequately the mathematical needs of youth and society. Among devices that may be used to create greater interest in secondary mathematics are scholarships or contests similar to the Westinghouse Science Talent Search. Mayor (35) determined what mathematics contests were held and what scholarships given in the different states, by polling state representatives of the National Council of Teachers of Mathematics. He found that little use was made of these devices for creating interest, altho opinion favored their use. The need for counseling was substantiated by Kinzer and Kinzer (29) who found that students who ranked low on an arithmetic problem test obtained low grades in college chemistry. Those who accepted remedial instruction in arithmetic were given a second arithmetic test. This group did satisfactory work in chemistry and their outcomes in chemistry were better predicted by the second test.

The quest for improved methods of predicting success in mathematics has continued to attract a number of investigations. Rosilda (43) studied the relation between IQ and scores on a first year algebra test for 635 ninth-grade pupils, finding a correlation coefficient of .42. Bromley and Carter (9) found that scores on college entrance tests did not correlate highly with average college mathematics grades. Their correlation coefficients ranged from .11 on the Silent Reading Ability Test to .35 on the Cooperative General Achievement Test score; rank in high school correlated .40 with college mathematics grades. Frederiksen (14) constructed a grade prediction graph for the courses in Algebra and Trigonometry, and Elementary Calculus at Princeton University. This graph was based upon a variety of factors, including the Cooperative-Survey Test verbal and mathematical factors, converted school grades, number of terms of mathematics previously studied, age and year of high-school graduation, level of comprehension score, and veteran status. It was found to have a predictive value within one grade range.

Study of methods for identifying causes of mathematical difficulties and remedial procedures continue to hold an important position in educational research. Arthur (3) devised a test to identify specific difficulties in the fundamental processes and problem solving in arithmetic.

The test was administered to about 200 freshmen in each of two years. He found a large proportion of high-school students incompetent in arithmetic, but that high-school courses typically do not provide for correction of these deficiencies. He recommended that remedial teaching be carried on in all high-school classes. Cruickshank (12) compared the ability of retarded children of a given mental age with normal children of the same age in ability to solve verbal problems. He found that the presence of extraneous materials in problem situations caused confusion to both groups, but the confusion was much greater in the retarded groups. Northrup, Pingry, and Winsor (39) made a functional item analysis of responses to items of the Cornell Mathematics Test, taken by 416 freshmen. The errors were tabulated according to classified groups of test items, to locate the groups in need of remedial help. They found that this analysis provided the teacher with an effective basis for remedial instruction. Bloom and Broder (7) investigated the differences in procedures of students in solving problems. Five categories of difficulties were identified and remedial programs devised. The students who were given assistance made significant gains over control groups of comparable ability. Gibney (17) appraised the value on grades in geometry from sectioning classes on the basis of aptitude tests. Students of lower aptitude were provided with much visual material and construction activities. Failures were considerably reduced and student interest increased. Habel (18) studied the extent to which a course in algebra and a course in general mathematics prepared students for success in dealing with percentage and also with fractions and radicals necessary for trigonometry. Initial and final tests were given in one semester courses in algebra and general mathematics. Neither course prepared students adequately for trigonometry. The need for additional remedial teaching in trigonometry, was evident. Archer (2) designed and evaluated a procedure for teaching plane geometry effectively to mentally, physically, and emotionally handicapped pupils. A laboratory method was devised with extensive use of models and student activity. Twice as much time was used as in regular classes. Tension of the pupils was greatly lessened and achievement was very satisfactory. Berger (5) surveyed 500 colleges by questionnaire to determine the provisions being made for students poorly prepared in algebra. Eighty-five percent of those responding considered that freshmen are not prepared for college algebra. Methods to reduce failures included placement tests, homogeneous grouping, individual help outside of class and an elementary noncredit course. Such courses were found in half of the schools responding.

Testing Technics

A relatively small number of studies were directed to investigation of testing procedures and their effectiveness. Sears (49) reviewed the development of aims, content and structure of algebra tests since 1917, when the first was published by Clark. Factors that have brought about changes were (a) course modifications, (b) new methods and materials, (c) refinement of technics for test construction, (d) changing objectives, and (e) the emerging concept of evaluation. The author concluded that a new concept of evaluation, in keeping with the psychology of learning which considers the growth of the individual as a whole, will have to be formulated. The presentation of evidence supporting this theory was the over-all idea of this study. In keeping with this new concept of evaluation she concluded that present practice in testing seems to be defining a more comprehensive evaluation of ability in algebra as that which includes the evaluation of personality traits as well as the evaluation of achievement in subjectmatter.

Michaelis (37) reviewed current practices in evaluation used in city school systems thruout the country. He concluded that, among the outcomes least adequately evaluated, were: democratic behavior, critical thinking, group processes, and social understanding of attitudes.

Kenney (26) examined a sample of 22 group intelligence tests for mathematical content. His findings led to the conclusion that "at least one of the abilities constituting intelligence is that of handling mathematical materials of various kinds." The percentage in individual tests ranged from 1 percent to 56 percent of the test.

Plumlee (40) undertook to determine whether verbal and nonverbal tests of mathematical ability measured the same factors, and whether there is a higher degree of relationship between verbal aptitude and verbal mathematics than between nonverbal aptitude and nonverbal mathematics. He found the measures of nonverbal mathematics more reliable than those of verbal mathematics. Differences in the measured abilities were not closely related to differences in verbal aptitude.

Teacher Preparation

Study of teacher preparation reveals a wide diversity between present status and desired preparation. Wilson (55) stated that "there have been many complaints in recent years that the training of the mathematics teacher is unsatisfactory in the light of present conditions in the high schools." That study produced evidence to support the following courses and experiences in preservice training of secondary mathematics teachers: statistics, applied mathematics, mathematics of finance, history of mathematics, field work in mathematics, audio-visual aids, and social problems.

Layton (31) investigated the rules and regulations on certification of mathematics teachers in the 48 states and the District of Columbia. Requirements from the office in charge of certification in each state were analyzed for professional and mathematics requirements and contrasted with requirements in English, art, and geography. Opinions on mathematics course work deemed necessary for mathematics teachers on different levels, minimum grade, and recommendations from colleges were obtained by questionnaire from certification officers in the states.

He found that requirements in mathematics for certificates for lower elementary grades had a nationwide mean in semester hours of .52 for content and .16 for method. This was considerably lower than corresponding preparation for English, geography, or art, while the mean professional requirement for this certificate was 13.01 semester hours. Very few states required any mathematics content or methods for the lower grades and only 11 states required mathematics content for upper grades. For secondary mathematics teaching credentials, all states require professional content, but there is little agreement on specific courses. About 30 percent of the states required no mathematics content courses. The range of content courses required was from zero to 24 semester hours, with a mean of about 10 semester hours. Only five states specified particular content courses for the secondary credential, with "little consistency among them." Only one state required study in related fields. The total number of mathematics hours required was less than the number for English teachers.

Ayre (4) studied the training, experience, teaching load, course offerings, class size, and salaries for junior college mathematics teachers in eight central states. He found that all of the 100 teachers held bachelor's degrees, 91 percent held masters degrees, and 3 percent held the doctorate. Mathematics was the major subject for 70 percent of the undergraduate degrees, 55 percent of the masters degrees, and all of the doctors degrees. Twenty-four percent did major study in education and only 5 percent in mathematics education. Mean semester hours of study in the various areas were: undergraduate mathematics 27.2, graduate mathematics 21.0, related areas 14.0, and mathematics education 6.3. Teachers in general indicated that their graduate and undergraduate training was adequate in all respects, but to the question, "How could it have been improved?" 40 percent replied more mathematics, 60 percent more work in related areas, 8 percent more education courses, and 27 percent more mathematics education. The mean number of periods taught per week was 17 with a range from four to 33. Class size ranged from two to 42 with 20 the average. Salary ranged from $2325 to $5645 with the median $3600 and mean $3500.

Studies directed to improvement of teacher preparation have utilized the survey of opinion, and experimentation.

Thacker and Read (53) polled 263 high-school mathematics teachers, 107 heads of college mathematics departments, and 83 heads of college education departments in the middle west to find the college courses they considered desirable in training secondary mathematics teachers. A high degree of uniformity in responses of the three groups was found, with the first 10 subjects being college algebra, trigonometry, methods in high-school mathematics, solid geometry, educational psychology, supervised teaching, analytic geometry, general high-school methods, college geometry, and advanced college algebra. The most conspicuous disagreement was that heads of college mathematics ranked differential and integral calculus eighth and ninth, whereas they ranked 22 and 23 on the basis of total replies. High-school mathematics teachers tended to favor professional courses to a greater extent than did college education department heads. It was concluded: "It would appear that the profession as a whole is closer to agreement as to what the professional needs are than is generally believed."

Slack (50) set up and evaluated a course pointed toward increasing competence of prospective teachers of secondary mathematics. A checklist of competencies for mathematics teachers was adapted from an authoritative list with the cooperation of practicing teachers. On the basis of that list experiences for a course were formulated, the course taught, and the attainment of competencies evaluated. Based on the outcomes from that course, recommendations for revision were made. It was concluded that six term hours would be required to attain the desired ends, a study of relative importance of the different competencies was needed, and more concrete experiences in demonstrating methods and technics and exploration of multisensory aids in teaching mathematics were needed. Suggestions for improving evaluation technics for such a course included substituting small groups for individual conferences, refinements of observational data, and improved testing.

Bibliography

1. ANDERSON, ROWLAND C. *Applications from Aerial Navigation for the Teaching of Mathematics.* Report of Type C Project. New York: Teachers College, Columbia University, 1949. 168 p.
2. ARCHER, ALLENE. "Teaching Plane Geometry to Mentally, Physically, and Emotionally Handicapped Pupils." *Mathematics Teacher* 44: 183-85. March 1951.
3. ARTHUR, LEE E. "Diagnosis of Disabilities in Arithmetic Essentials." *Mathematics Teacher* 43: 197-202; May 1950.
4. AYRE, HENRY G. "On the Status of Teacher Load, Salary, and Professional Preparation of Junior College Mathematics Teachers." *Mathematics Teacher* 43: 54-60; February 1950.
5. BERGER, MARGARET L. "Provisions for Meeting the Needs of Poorly Prepared Students in Algebra." *Mathematics Teacher* 43: 107-11; March 1950.
6. BETZ, WILLIAM. "Mathematics for the Millions or the Few." *Mathematics Teacher* 44: 20-21; January 1951.
7. BLOOM, BENJAMIN S., and BRODER, LOIS J. *Problem Solving Processes of College Students.* Chicago: University of Chicago Press, 1950. Reviewed in "Research in Mathematics Education." *Mathematics Teacher* 44: 250-52; April 1951.
8. BRESLICH, ERNEST R. "Importance of Mathematics in General Education." *Mathematics Teacher* 44: 1-6; January 1951.
9. BROMLEY, ANN and CARTER, GERAL C. "Predictability of Success in Mathematics." *Journal of Educational Research* 44: 148-50; October 1950.
10. BROWN, KENNETH E. "The Content of a Course in General Mathematics—Teachers' Opinions." *Mathematics Teacher* 43: 25-30; January 1950.
11. BROWN, KENNETH E. "Why Teach Geometry?" *Mathematics Teacher* 43: 103-106; March 1950.
12. CRUICKSHANK, WILLIAM M. "Arithmetic Ability of Mentally Retarded Children." *Journal of Educational Research* 42: 161-70; November 1948.
13. FAWCETT, HAROLD P. "A Unified and Continuous Program in Mathematics." *School Science and Mathematics* 50: 342-48; May 1950.

14. FREDERIKSEN, NORMAN. "Predicting Mathematics Grades of Veteran and Nonveteran Students." *Educational and Psychological Measurement* 9: 173-88; Spring 1949.
15. FURST, EDWARD J. "Effect of the Organization of Learning Experience upon the Organization of Learning Outcomes." *Journal of Experimental Education* 18: 215-28, 343-52; March, June 1950.
16. GAGER, WILLIAM A. "Concepts for Certain Functional Mathematics Courses." *School Science and Mathematics* 50: 533-39; October 1950.
17. GIBNEY, ESTHER F. "Aptitude Tests in Relation to the Teaching of Plane Geometry." *Mathematics Teacher* 42: 181-86; April 1949.
18. HABEL, E. A. "An Experiment in the Diagnosis and Remedy of Errors of College Freshmen in Arithmetic and Radicals." *School Science and Mathematics* 51: 105-13; February 1951.
19. HLAVATY, JULIUS H. *Changing Philosophy and Content in Tenth Year Mathematics.* Doctor's thesis. New York: Teachers College, Columbia University, 1950. 175 p. (Typewritten)
20. IBRAHIM, ABDEL-AZIZ E. "Philosophies of Education, Their Implications for Mathematics Curriculum and Classroom Procedures," reported in "Research in Mathematical Education." *Mathematics Teacher* 44: 53; January 1951.
21. JOHNSON, DONOVAN A., and SYER, HENRY W. "A Bibliography of Mathematics Films and Filmstrips." *School Science and Mathematics* 49: 650-57; November 1949.
22. JOHNSON, DONOVAN A. *An Experimental Study of the Effectiveness of Certain Visual Aids in Plane Geometry.* Doctor's thesis. University of Minnesota; December 1948, reviewed in "Research in Mathematics Education." *Mathematics Teacher* 43: 410-11; December 1950.
23. JOHNSON, DONOVAN A. "Are Films and Film Strips Effective in Teaching Geometry?" *School Science and Mathematics* 50: 570-74; October 1950.
24. JONES, PHILLIP S.; BECKETT, K. EILEEN; PRICE, H. VERNON; and TERHUNE, VIRGINIA. "A Report on Progress in Mathematical Education." *School Science and Mathematics* 49: 465-74; June 1949.
25. JONES, PHILLIP S.; BECKETT, K. EILEEN; PRICE, H. V.; and TERHUNE, VIRGINIA. "1949-1950 Program of the Mathematical Trends Committee, Committee Report." *School Science and Mathematics* 50: 453-54; June 1950.
26. KENNEY, JOHN J. "Mathematics in Group Intelligence Tests." *Journal of Educational Research* 44: 129-33; October 1950.
27. KINNEY, ALVIN E. *Mathematics at New York State Maritime College.* Doctor's thesis. New York: Teachers College, Columbia University, 1950. 136 p. (Typewritten)
28. KINSELLA, JOHN J. "The Adolescent and Arithmetic." *School Science and Mathematics* 50: 119-24; February 1950.
29. KINZER, JOHN R., and KINZER, LYDIA G. "College Chemistry Students Deficient in Arithmetic Academic Data." *Educational Research Bulletin* 27: 8-10, 27; January 21, 1948.
30. KRAMER, MAX. *Mathematics in Meteorology, with Suggestions for Teachers of Mathematics and Meteorology.* Doctor's thesis. New York: Teachers College Columbia University, 1949. 311 p.
31. LAYTON, WILLIAM I. "The Certification of Teachers of Mathematics." *Mathematics Teacher* 42: 377-80; December 1949.
32. LEWIS, HARRY. "An Experiment in Developing Critical Thinking Through the Teaching of Plane Demonstrative Geometry." *Mathematics Teacher* 43: 411-13; December 1950.
33. LOFLIN, ZACHARIAH L. *Mathematics in Chemical Engineering.* New York: Teachers College, Columbia University, 1949. Reported in "Research in Mathematics Education." *Mathematics Teacher* 44: 53; January 1951.
34. LUECK, WILLIAM R. "An Experiment in Writing Algebra Equations." *Journal of Educational Research* 42: 132-37; October 1948.
35. MAYOR, JOHN R. "Would Contests and Scholarships Contribute to Increased Interest in Mathematics?" *Mathematics Teacher* 42: 283-89; October 1949.
36. MICHAEL, R. E. "The Relative Effectiveness of Two Methods of Teaching Certain Topics in Ninth Grade Algebra." *Mathematics Teacher* 42: 83-87; February 1949.

37. MICHAELIS, JOHN U. "Current Practices in Evaluation in City School Systems," *Educational and Psychological Measurement* 9: 15-22; Spring 1949.
38. NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS. *The Metric System of Weights and Measures.* Twentieth Yearbook. New York: Bureau of Publications, Teachers College, Columbia University, 1948. 303 p.
39. NORTHRUP, GRANT J.; PINGRY, ROBERT E.; WINSOR, A. L. "A Functional Item Analysis of Group Performance in General Mathematics." *Journal of Experimental Education* 18: 279-85; March 1950.
40. PLUMLEE, LYNETTE B. "The Verbal Component in Mathematic Items." *Educational and Psychological Measurement* 9: 679-84; Winter 1949.
41. PURDY, CHARLES RICHARD. *An Experimental Course in College General Mathematics.* Doctor's thesis. Stanford, Calif.: Stanford University, 1949. 195 p. (Typewritten)
42. RICH, BARNETT. *Variation, Its Extension and Application to Problem Solving.* Doctor's thesis. New York: Teachers College, Columbia University, 1949. 175 p. (Typewritten)
43. ROSILDA, SISTER M. "Is an I.Q. an Index to Algebra Ability?" *Journal of Educational Research* 44: 391-93; January 1951.
44. ROSSKOPF, MYRON F. "The Place of Mathematics in General Education." *School Science and Mathematics* 49: 565-70; October 1949.
45. SANFORD, CHARLES W. "High School Science and Mathematics, For Whom and for What?" *School Science and Mathematics* 50: 307-19; April 1950.
46. SCHAAF, WILLIAM L., column editor. "Mathematics and Engineering." *Mathematics Teacher* 44: 54-57; January 1951.
47. SCHAAF, WILLIAM L. "New Emphases in Mathematical Education, with References to Recent Literature." *School Science and Mathematics* 49: 639-49; November 1949.
48. SCHULTZ, MARGARET, and OHLSEN, MERLE M. "A Comparison of Traditional Teaching and Personalized Teaching in Ninth Grade." *Mathematics Teacher* 42: 91-96; February 1949.
49. SEARS, VIRGINIA P. *A Study of the Evaluation of Learning in High School Algebra.* Doctor's thesis. New York: Teachers College, Columbia University, 1949. 152 p.
50. SLACK, JOSEPH LOWELL. *An Experimental Course for Developing Teaching Competence in Secondary School Mathematics.* Doctor's thesis. Stanford, Calif.: Stanford University, 1948. 223 p. (Typewritten)
51. STURM, HAROLD E. "Development of a Junior College Mathematics Program for Non-Science—Non-Mathematics Majors." *School Science and Mathematics* 50: 437-41; June 1950.
52. SUELTZ, BEN A. "Mathematical Understandings and Judgments Retained by College Freshmen." *Mathematics Teacher* 44: 13-19; January 1951.
53. THACKER, GEORGE R., and READ, CECIL B. "Courses Desirable for Training Teachers of High School Mathematics." *School Science and Mathematics* 49: 611-19; November 1950.
54. VAN ENGEN, HENRY. "Arithmetic in the Junior-Senior High School." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 103-15.
55. WILSON, JACK DOUGLAS. *Trends in Elementary and Secondary School Mathematics 1918-1948.* Doctor's thesis. Stanford, Calif.: Stanford University, 1949. 472 p. (Typewritten)
56. WILSON, JACK DOUGLAS; CARPENTER, DALE; and NIHARD, CLAUDE E. *Mathematics, A Must in the Skilled Trades.* Los Angeles: Curriculum Office, 1950. (Hectographed)

CHAPTER VI

J. FRED WEAVER

Teacher Education in Arithmetic

THREE years ago Burnett and Gragg (1) deplored the paucity of research in the broad area of "Teacher Education in Science and Mathematics" for the three-year period covered by their review. A similar concern, in regard to "Teacher Education in Arithmetic," can be noted for the three-year period just ending. Altho there has been some encouraging research activity, the amount completed and reported has been small in relation to the great need for productive research in this area.

Current Status of Requirements for Teachers of Arithmetic

Grossnickle (5), Layton (6, 7), and Rhoads (10) conducted independent studies which relate, in whole or part, to the academic and professional requirements for the preparation of teachers of arithmetic. Grossnickle's chief sources of data included general professional literature on the subject, catalogs from liberal arts colleges and universities which have departments or colleges of education that prepare teachers for the elementary school, and replies from a questionnaire sent to accredited teachers colleges. Layton's data were drawn from official certification rules and regulations for teachers of mathematics, Grades I thru XII, for each of the states and the District of Columbia; and from replies to questionnaires submitted to each state certification officer and to nationally recognized specialists in mathematics. Rhoads secured her data from normal school and teachers college catalogs; from letters of inquiry sent to the superintendent of schools, or public instruction, in each state and the District of Columbia; and from previous research and general professional literature on the subject.

All three studies pointed to the extremely low requirements in the subjectmatter of mathematics for those preparing to teach in the elementary schools. Both Grossnickle (5) and Rhoads (10) reported that three-fourths of the teachers colleges require *no* credits in secondary-school mathematics for admission. Furthermore, Layton (7) reported that only 10 states require any work in background mathematics at the college level for certifying applicants without teaching experience. The mean requirements were reported as .52 semester hours. Paralleling this condition, Grossnickle (5) reported that only one out of 62 departments of education in liberal arts colleges, and only three out of 18 colleges of education, require any work in background mathematics as part of the training program for elementary-school teachers. The mean requirements were reported as .1 semester hours for the departments of education and .5 semester hours for the colleges of education. The condition in the state teachers colleges is slightly better, but not encouragingly so. Between one-third and two-thirds of the state teachers colleges require work in background mathematics, depending upon the different general or specialized curriculums offered. The mean requirements ranged between 1.2 semester hours and 2.0 semester hours. Generally speaking, both Grossnickle (5) and Rhoads (10) found that during the past 25 years, whereas the over-all training period for teachers in the elementary school has increased from a mode of two years to a mode of four years, the amount of required work in background mathematics has decreased dangerously. Both Grossnickle (5) and Layton (7) recommend six semester hours of work in background mathematics as a minimum requirement for elementary-school teachers, regardless of curriculum level of specialization.

As reported by these three studies, the situation as regards required work in the methods of teaching arithmetic is little better than that for required work in background mathematics. Again, the requirements are dangerously low. Both Grossnickle (5) and Rhoads (10) reported a marked tendency for work pertaining to the teaching of arithmetic to be absorbed as part of general methods courses. Grossnickle (5) reacted against this condition and recommended a separate course, apart from the one in general methods, dealing with the specific problems of teaching arithmetic in the elementary school. This was recommended as required work for all persons in training except those who will specialize in fields such as music and the arts.

For those who will teach arithmetic in Grades VII and VIII, both Grossnickle (5) and Layton (7) recommended the equivalent of a minor in background mathematics and a special course in methods of teaching mathematics at this level of the educational ladder.

Further Recommendations Which Point to Needed Research

Several significant articles and papers have appeared in recent professional literature which do not report completed research, but which do make suggestions and recommendations that may be significant in pointing the direction and trend of needed research in the future.

Mayor (8) forwarded six goals for the preservice and inservice training of teachers of arithmetic and discussed means by which these goals may be realized. Wren (13) analyzed functional competence in arithmetic into six attributes which were forwarded as major objectives in the teaching of arithmetic, and discussed the implications of each for teacher education. Altho these two sets of goals or objectives differ understandably in several respects, both Mayor (8) and Wren (13) find common ground in their recognition of the importance of "meanings" in the teaching-learning situation. Yorke (14) made recommendations for the preservice preparation of teachers, "based on the functional theory of education that the arithmetic taught and the processes stressed must be those most used in life." It should be noted that Wren's "functional competence" is allied very closely with the "meaning theory" of arithmetic instruction, but Yorke's "functional theory of education" is related very closely to the "social-utility theory" of arithmetic instruction. These two points of view regarding the teaching of arithmetic are not identical.

Newsom (9) recommended that all prospective elementary-school teachers should have completed a minimum of two years of secondary-school mathematics for admission to teacher-training institutions; and that three, and preferably six, semester hours of work in background mathematics be required at the college level, in addition to a required course in the teaching of arithmetic. These are quite consistent with previously mentioned recommendations, such as those by Grossnickle (5). Newsom (9), furthermore, outlined in some detail the nature and content of the recommended work in background mathematics. Weaver (11) emphasized the importance of work in background mathematics at the college level. He, as well as Grossnickle (5) and Newsom (9), stressed the importance of emphasizing meanings and understandings in the background course if arithmetic is to be taught "meaningfully" in our elementary schools in the future. Wilburn and Wingo (12), in discussing the broad issues of an inservice training program, also recognized the need for directing greater attention to an *understanding* of arithmetic on the part of prospective teachers in teacher-training institutions, and the relation of this emphasis upon understanding to successful methods of teaching.

Almost without exception these articles and papers have brought to the foreground the crucial importance of basic mathematical understandings for the prospective teacher of arithmetic in the elementary schools. The research in this aspect of teacher-training is almost nonexistent, but the need for research activity is most urgent.

The Trend and Nature of Needed Future Research

Glennon (3, 4) was the only worker to report significant research on basic mathematical understandings in teacher-education programs. Based on a study of 144 freshmen, 172 seniors, and 160 teachers-in-service with experience ranging from one thru 34 years, all of whom were enrolled in one or another of three teachers colleges, Glennon (4) concluded that there is no significant difference in the achievement of basic mathematical understandings between: (a) teachers college freshmen and teachers college seniors: (b) teachers college seniors who have taken a course in the "Psychology and Teaching of Arithmetic" and those who have not taken such a course; and (c) teachers-in-service who have done graduate work in the "Psychology and Teaching of Arithmetic" and those who have not done such work. Also, virtual zero-correlation was observed between achievement of basic mathematical understandings on the part of teachers-in-service and the length of teaching experience.

Based on his own research findings, Glennon (4) reached conclusions which were thoroly consistent with the recommendations of other persons: that present preservice and inservice training programs are inadequate from the standpoint of their attention to the development of basic mathematical understandings; and that adequate training programs must include, among other things, required work in background mathematics as well as required work in the specific problems of teaching arithmetic.

Fehr (2) listed the following as one of several problems "needful of solution and adaptable to action research" in the field of elementary-school arithmetic: "What educational preparation is both necessary and sufficient for the successful teacher of the newer arithmetic program?" More specifically, one might ask: In the preservice and in-service preparation of teachers of arithmetic, *what* work in background mathematics and related teaching methods is most valid and effective? A start has been made. Research, however, must lead the way in determining the validity and effectiveness of those and other hypotheses.

Bibliography

1. BURNETT, R. WILL, and GRAGG, LILLIAN. "Teacher Education in Science and Mathematics." *Review of Educational Research* 18: 364-67; October 1948.
2. FEHR, HOWARD F. "Present Research in the Teaching of Arithmetic." *Teachers College Record* 52: 11-23; October 1950.
3. GLENNON, VINCENT J. *A Study of the Growth and Mastery of Certain Basic Mathematical Understandings on Seven Educational Levels.* Doctor's thesis. Cambridge: Graduate School of Education, Harvard University, 1948. (Typewritten)
4. GLENNON, VINCENT J. "A Study in Needed Redirection in the Preparation of Teachers of Arithmetic." *Mathematics Teacher* 42: 389-96; December 1949.
5. GROSSNICKLE, FOSTER E. "The Training of Teachers of Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 203-31.
6. LAYTON, WILLIAM I. *An Analysis of Certification Requirements for Teachers of Mathematics.* Contribution to Education, No. 402. Nashville: George Peabody College for Teachers, 1949. 215 p.
7. LAYTON, WILLIAM I. "The Certification of Teachers of Mathematics." *The Mathematics Teacher* 42: 377-80; December 1949.
8. MAYOR, JOHN R. "Special Training for Teachers of Arithmetic." *School Science and Mathematics* 49: 539-48; October 1949.
9. NEWSOM, CARROLL V. "Mathematical Background Needed by Teachers of Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 232-50.
10. RHOADS, MARGARET V. *The Training of Elementary School Arithmetic Teachers.* Ed.D. project report. New York: Teachers College, Columbia University, 1950. (Typewritten)
11. WEAVER, J. FRED. "A Crucial Aspect of Meaningful Arithmetic Instruction." *The Mathematics Teacher* 43: 112-17; March 1950.
12. WILBURN, D. BANKS, and WINGO, G. MAX. "In-Service Development of Teachers of Arithmetic." *The Teaching of Arithmetic.* Fiftieth Yearbook, Part II, National Society for the Study of Education. Chicago: University of Chicago Press, 1951. p. 251-68.
13. WREN, F. LYNWOOD. "The Professional Preparation of Teachers of Arithmetic." *Arithmetic 1948.* Supplementary Educational Monographs, No. 66. Chicago: University of Chicago Press, 1948. p. 80-90.
14. YORKE, GERTRUDE C. "The Preparation Needed by Teachers of Arithmetic." *Education* 69: 373-75; February 1949.

Index to Volume XXI, No. 4

Page citations are made to single pages; these are often the beginning of a chapter, section or running discussion dealing with the topic.

Achievement, chemistry, 264; environmental differences in science, 269; individual differences and mathematics, 297; mathematics, 297
Addition, 291
Aims and purposes, biology, 275; mathematics, 305; science, 249
Arithmetic, appraisal of practice, 290; children's preferences, 297; evaluation, 296; problem solving, 296; readiness, 294; remedial, 310; teacher education, 317; textbooks, 294; (See also mathematics)
Attitudes, and science teaching, 259
Audio-visual aids, 284; in mathematics, 296; in science teaching, 284; motion pictures and film strips, 284

Biology, aims of Egyptian teachers of, 275; difficulty of textbooks, 282; preparation of teachers, 265; teaching technics, secondary schools, 265

Certification, arithmetic teachers, 317
Chemistry, achievement in, 264; college, 266; junior college, 268; preparation of teachers, 265; teaching technics, secondary schools, 264
Critical thinking, 270
Current practices, science teaching 264
Curriculum, 249; changes in secondary school science, 253; elementary science, 251; mathematics, 300, 305; science, 249; secondary school science, 252, 254.

Demonstrations, science, 277; apparatus, 288
Difficulty of science material, 281
Division, 295

Enrolments, college general education science courses, 274; science, 252
Evaluation, algebra, 311; arithmetic, 296; critical thinking, 257; mathematics, 298, 311; meaning approach in mathematics, 291; practices, 260; science achievement, 257; thought processes, 296

Films and filmstrips, analysis of, 285; in science teaching, 284; in teaching geometry, 309
Fractions, teaching of 292

General education, 256; college science courses, 256, 273
Geology, 255
Graphic materials, difficulties in use of, 286; science, 286

Inservice teacher education, arithmetic, 319
Instructional materials, 266; elementary science, 280; geometry, 309; graphic, 286; laboratory, 286; mathematics, 296; pamphlets, 283; science, 279, 281
Instructional procedures in science, 264

Laboratory experiences, criteria for, 286; relation to content of textbooks, 288
Laboratory methods, 287

Mathematics, 290, 305; achievement, 297; aims and purposes, 305; college, 305; contents of courses, 306; counseling in secondary program, 310; curriculum, 305; elementary school, 290; in aerial navigation, 306; in intelligence tests, 311; in science, 306; in secondary schools, 305; in skilled trades, 306; junior high school, 290, 298; meaning in, 293; methods, 291; predicting success, 297, 310; remedial procedures, 310; teacher education, 312
Measurement (See evaluation)
Methods, inductive vs. deductive, 287; mathematics, 291, 308; meaning approach, 291; science, 264
Motion pictures, 284; effectiveness of, 285; narration in, 285; (See also audio-visual aids)

Needed research, in college general education science courses, 275; in mathematics, 290; in teacher education, 318

Objectives, bases of, 250; of biology in Egypt, 275; of mathematics teaching, 305; of science teaching, 249

Pamphlets, evaluation of, 282; use of, 282
Preservice teacher education, arithmetic, 319
Problem solving, in arithmetic, 296; in mathematics, 300; in science, 270

Readers, science content, 281

Readiness, in arithmetic, 294
Reading ability, and success in mathematics, 297
Reading difficulty, pamphlets, 282; science textbooks, 282
Remedial instruction, in arithmetic, 294, 310

Science, 249, 264; college, 256; curriculum, 251; difficulties in teaching, 279; elementary school, 268; enrolments, 252; general education, 256; instructional materials, 279, 280; instructional procedures, 264; methods, 264; nature of highschool courses, 254; secondary school, 252; teacher education, 275; textbooks, 271, 281
Science teaching, 264, 279; aims and purposes, 249; and attitude change, 259, 269; elementary school, 268
Scientific method, and critical thinking, 270; in textbooks, 271; nature of, 250, 271; teaching procedures, 271
Sensory aids, in mathematics, 296; in science teaching, 280
Social aspects of arithmetic, 293

Teacher education, arithmetic, 317; elementary arithmetic, 317; junior high school arithmetic, 318; inservice, 319; mathematics, 312; preservice, 319; recommendations, 314, 318; science, 275
Teaching aids, business-sponsored materials, 283; current materials, 266
Teaching technics, 264, 290, 305; and achievement, 264; biology, 265; chemistry, 264; college science, 256, 266, 274; enrichment, 267; film vs demonstration, 267; mathematics, 290, 308; scientific method, 271; semimicro- vs macro-methods, 277
Textbooks, arithmetic, 294; difficulty of science, 281; junior high school science, 281; scientific method in, 271; use of teaching aids in biology textbooks, 282

Visual aids (See audio-visual aids)
Vocabulary studies, in science, 281